1986

Guide to Chemical Weed Control

86-01651/

Conversion Table For Herbicide Rates Per Acre

To convert herbicide rate per hectare to rate per acre use the conversion table below:

L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre	L / ha or kg / ha	L / acre or kg / acre
0.00	0.00	2.00	0.81	4.00	1.62	6.00	2.43	8.00	3.24	10.00	4.05	12.00	4.86	14.00	5.67	16.00	6.48	18.00	7.28
0.05	0.02	2.05	0.83	4.05	1.64	6.05	2.45	8.05	3.26	10.05	4.07	12.05	4.88	14.05	5.69	16.05	6.50	19.00	7.69
0.10	0.04	2.10	0.85	4.10	1.66	6.10	2.47	8.10	3.28	10.10	4.09	12.10	4.90	14.10	5.71	16.10	6.52	20.00	8.09
0.15	0.06	2.15	0.87	4.15	1.68	6.15	2.49	8.15	3.30	10.15	4.11	12.15	4.92	14.15	5.73	16.15	6.54	21.00	8.50
0.20	0.08	2.20	0.89	4.20	1.70	6.20	2.51	8.20	3.32	10.20	4.13	12.20	4.94	14.20	5.75	16.20	6.56	22.00	8.90
0.25	0.10	2.25	0.91	4.25	1.72	6.25	2.53	8.25	3.34	10.25	4.15	12.25	4.96	14.25	5.77	16.25	6.58	23.00	9.30
0.30	0.12	2.30	0.93	4.30	1.74	6.30	2.55	8.30	3.36	10.30	4.17	12.30	4.98	14.30	5.79	16.30	6.60	24.00	9.71
0.35	0.14	2.35	0.95	4.35	1.76	6.35	2.57	8.35	3.38	10.35	4.19	12.35	5.00	14.35	5.81	16.35	6.62	25.00	10.12
0.40	0.16	2.40	0.97	4.40	1.78	6.40	2.59	8.40	3.40	10.40	4.21	12.40	5.02	14.40	5.83	16.40	6.64	26.00	10.52
0.45	0.18	2.45	0.99	4.45	1.80	6.45	2.61	8.45	3.42	10.45	4.23	12.45	5.04	14.45	5.85	16.45	6.66	27.00	10.93
0.50	0.20	2.50	1.01	4.50	1.82	6.50	2.63	8.50	3.44	10.50	4.25	12.50	5.06	14.50	5.87	16.50	6.68	28.00	11.33
0.55	0.22	2.55	1.03	4.55	1.84	6.55	2.65	8.55	3.46	10.55	4.27	12.55	5.08	14.55	5.89	16.55	6.70	29.00	11.74
0.60	0.24	2.60	1.05	4.60	1.86	6.60	2.67	8.60	3.48	10.60	4.29	12.60	5.10	14.60	5.91	16.60	6.72	30.00	12.14
0.65	0.26	2.65	1.07	4.65	1.88	6.65	2.69	8.65	3.50	10.65	4.31	12.65	5.12	14.65	5.93	16.65	6.74	31.00	12.55
0.70	0.28	2.70	1.09	4.70	1.90	6.70	2.71	8.70	3.52	10.70	4.33	12.70	5.14	14.70	5.95	16.70	6.76	32.00	12.95
0.75	0.30	2.75	1.11	4.75	1.92	6.75	2.73	8.75	3.54	10.75	4.35	12.75	5.16	14.75	5.97	16.75	6.78	33.00	13.36
0.80	0.32	2.80	1.13	4.80	1.94	6.80	2.75	8.80	3.56	10.80	4.37	12.80	5.18	14.80	5.99	16.80	6.80	34.00	13.75
0.85	0.34	2.85	1.15	4.85	1.96	6.85	2.77	8.85	3.58	10.85	4.39	12.85	5.20	14.85	6.01	16.85	6.82	35.00	14.16
0.90	0.36	2.90	1.17	4.90	1.98	6.90	2.79	8.90	3.60	10.90	4.41	12.90	5.22	14.90	6.03	16.90	6.84	36.00	14.57
0.95	0.38	2.95	1.19	4.95	2.00	6.95	2.81	8.95	3.62	10.95	4.43	12.95	5.24	14.95	6.05	16.95	6.86	37.00	14.97
1.00	0.40	3.00	1.21	5.00	2.02	7.00	2.83	9.00	3.64	11.00	4.45	13.00	5.26	15.00	6.07	17.00	6.88	38.00	15.38
1.05	0.42	3.05	1.23	5.05	2.04	7.05	2.85	9.05	3.66	11.05	4.47	13.05	5.28	15.05	6.09	17.05	6.90	39.00	15.78
1.10	0.45	3.10	1.25	5.10	2.06	7.10	2.87	9.10	3.68	11.10	4.49	13.10	5.30	15.10	6.11	17.10	6.92	40.00	16.19
1.15	0.47	3.15	1.27	5.15	2.08	7.15	2.89	9.15	3.70	11.15	4.51	13.15	5.32	15.15	6.13	17.15	6.94	41.00	16.59
1.20	0.49	3.20	1.30	5.20	2.10	7.20	2.91	9.20	3.72	11.20	4.53	13.20	5.34	15.20	6.15	17.20	6.96	42.00	17.00
1.25	0.51	3.25	1.32	5.25	2.12	7.25	2.93	9.25	3.74	11.25	4.55	13.25	5.36	15.25	6.17	17.25	6.98	43.00	17.40
1.30	0.53	3.30	1.34	5.30	2.14	7.30	2.95	9.30	3.76	11.30	4.57	13.30	5.38	15.30	6.19	17.30	7.00	44.00	17.81
1.35	0.55	3.35	1.36	5.35	2.17	7.35	2.97	9.35	3.78	11.35	4.59	13.35	5.40	15.35	6.21	17.35	7.02	45.00	18.21
1.40	0.57	3.40	1.38	5.40	2.19	7.40	2.99	9.40	3.80	11.40	4.61	13.40	5.42	15.40	6.23	17.40	7.04	46.00	18.62
1.45	0.59	3.45	1.40	5.45	2.21	7.45	3.02	9.45	3.82	11.45	4.63	13.45	5.44	15.45	6.25	17.45	7.06	47.00	19.02
1.50	0.61	3.50	1.42	5.50	2.23	7.50	3.04	9.50	3.84	11.50	4.65	13.50	5.46	15.50	6.27	17.50	7.08	48.00	19.43
1.55	0.63	3.55	1.44	5.55	2.25	7.55	3.06	9.55	3.86	11.55	4.67	13.55	5.48	15.55	6.29	17.55	7.10	49.00	19.83
1.60	0.65	3.60	1.46	5.60	2.27	7.60	3.08	9.60	3.89	11.60	4.69	13.60	5.50	15.60	6.31	17.60	7.12	50.00	20.24
1.65	0.67	3.65	1.48	5.65	2.29	7.65	3.10	9.65	3.91	11.65	4.71	13.65	5.52	15.65	6.33	17.65	7.14	60.00	24.28
1.70	0.69	3.70	1.50	5.70	2.31	7.70	3.12	9.70	3.93	11.70	4.74	13.70	5.54	15.70	6.35	17.70	7.16	70.00	28.33
1.75	0.71	3.75	1.52	5.75	2.33	7.75	3.14	9.75	3.95	11.75	4.76	13.75	5.56	15.75	6.37	17.75	7.18	80.00	32.38
1.80	0.73	3.80	1.54	5.80	2.35	7.80	3.16	9.80	3.97	11.80	4.78	13.80	5.58	15.80	6.39	17.90	7.20	90.00	36.42
1.85	0.75	3.85	1.56	5.85	2.37	7.85	3.18	9.85	3.99	11.85	4.80	13.85	5.61	15.85	6.41	17.85	7.22	100.00	40.47
1.90	0.77	3.90	1.58	5.90	2.39	7.90	3.20	9.90	4.01	11.90	4.82	13.90	5.63	15.90	6.43	17.90	7.24	110.00	44.52
1.95	0.79	3.95	1.60	5.95	2.41	7.95	3.22	9.95	4.03	11.95	4.84	13.95	5.65	15.95	6.45	17.95	7.26	120.00	48.56

Note: L/ha x 0.4047 = L/acre
kg/ha x 0.4047 = kg/acre

Example: 4.5 L/ha x 0.4047 = 1.82 L/acre

1986 Guide to Chemical Weed Control

Prepared by

Manitoba Agriculture in co-operation
with Weed Research Personnel in Industry,
University of Manitoba and Agriculture Canada.

The *Guide To Chemical Weed Control* includes the most recent herbicide recommendations for weed control in Manitoba. These recommendations must be combined with appropriate crop selection, proper recognition of the weed problem, and good cultural practices.

The rates and methods of application of herbicides are based on research and field experience. Further details on products recommended in this bulletin are outlined on the container labels.

NOTE: Crop tolerance and weed control ratings for herbicides are included in several of the summary tables (Tables 1, 2, 4, 5, 6, 7 and 9). These ratings are based on field experience and provide a general indication of the *consistency* of individual treatments when applied as recommended. Effectiveness of the treatment in any given year will depend on growing conditions and application methods and may be either better or worse than the averages indicated in the tables.

READ AND FOLLOW LABEL INSTRUCTIONS

If you have any doubt regarding the instructions in this bulletin, or on the product label, do not take a chance. Contact the company representative or Manitoba Agriculture for further advice.

This bulletin lists the recommended products for a weed problem giving the trade name of the product. Table 18 lists the technical names of the products corresponding to the trade names.

In the use of herbicides, responsibility rests on the user to prevent spray drift onto susceptible crops or damage to crops from improper use.

Additional information on chemical or cultural weed control may be obtained from your agricultural representative, weed specialist, or crop specialist of Manitoba Agriculture; the Plant Science Department, University of Manitoba; Agriculture Canada Research Stations at Brandon or Morden; the local weed supervisor or technical and sales representatives of the chemical industry.

FOR GOOD WEED CONTROL

- identify the weed problem.
- use the recommended herbicide.
- apply according to directions.

Any use of herbicides not recommended or not included in this publication must have the approval of the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

Before applying any herbicides, Government Departments, Crown Corporations, Municipal Corporations or any agent acting on their behalf, should contact the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

REFER TO THE 1986 ADDENDUM TO THE GUIDE TO CHEMICAL WEED CONTROL FOR PRODUCTS WITH NEW OR TEMPORARY REGISTRATIONS (AVAILABLE APRIL 1986)

SEE FIELD CROPS CHART AND FORAGE CROPS CHART AT BACK OF GUIDE

Using The Guide

The *Guide to Chemical Weed Control* contains information on registered herbicide uses which apply to Manitoba. Consult product labels for detailed instructions.

NOTE: As a service to farmers, **recommended rates in this Guide are given in terms of product (L or kg) per ACRE**. Note that product labels provide rates in metric units (L or kg per hectare) and in some instances imperial equivalents (gal or lb per acre). To avoid application errors be sure to read and understand label recommendations. **Be sure that the concentration of the product you are using matches the concentration shown in this Guide.** To check your rates, multiply the rate in L or kg/ha given on the product label by 0.4047 to obtain the rate in L or kg/acre or refer to the conversion chart inside the front cover of this Guide. If you are unsure about the correct amount of product to use, don't take a chance! Contact your local Ag Rep, Weed Supervisor or chemical company representative for clarification.

Weeds controlled by each herbicide are shown in summary tables, or are listed in the individual recommendation. Separate tables are included for corn (Table 3) and sugar beet (Table 8) herbicides. Herbicides for other field crops, including cereals are covered in a chart (Table 19) at the back of the Guide. A chart (Table 20) for forage crops is also included. Horticultural crop herbicides are summarized in Table 11.

Recommendations are grouped for each crop. Consider all recommendations available for the crop and select the one most suited to your situation. Additional information for most products is included in the section *Herbicide Information*. Refer also to the product label.

Most recommendations are for application using a standard type of field sprayer. Recommendations for aerial application are provided in a separate section (Table 12).

Refer to the Manitoba Agriculture publication *Field Sprayers* for information on sprayer calibration and adjustments. This publication also has information on specific nozzle types, pressures, heights, sprayer components, operation and cleaning. The Manitoba Agriculture factsheet *Calibration and Metric Conversions for Farm Sprayers* is also available.

Summary

1. Use appropriate summary charts to match the crop and weed problems to the herbicides available (most field and forage crops in Tables 19 and 20 at the back of the Guide).
2. Turn to section covering the crop.
3. Consider all possible alternatives and select the most suitable recommendation.
4. Refer, where indicated, to additional sources of information such as the *Herbicide Information* section.
5. Read and follow label instructions.

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Introduction

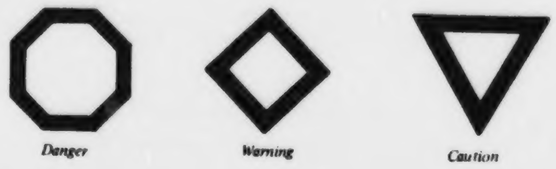
Rules for Effective Weed Control

- Identify your weed problem
- Select the proper herbicide for the crop and the weeds
- Use amine formulations of MCPA or 2,4-D for greater crop safety and to reduce the volatility hazard
- Adjust and calibrate your sprayer
- Apply herbicides at the proper stage for maximum weed control and crop safety
- Take time to do a proper job of application
- Leave a check strip to compare control results
- Check fields frequently throughout the season to assess results
- Look for ways to improve next year's weed control program

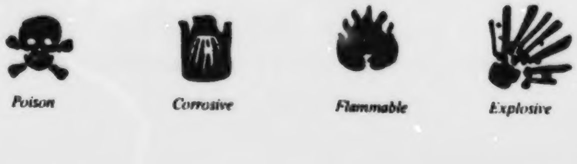
Practice Safety in Using Herbicides

Herbicides are classified according to the use hazard and risk involved. The categories of hazard are toxicity, flammability, explosive potential and corrosivity. The degree of risk is represented by symbols taken from common traffic sign shapes represented by the stop, caution and yield signs. The signal word for each of the signs is danger, warning and caution. Where the risk is minimal no designation is required. The label on the herbicide container will carry the appropriate signs for the protection of the user. The symbols are illustrated below:

Degree of Risk Symbols


Danger *Warning* *Caution*

Category of Hazard Symbols


Poison *Corrosive* *Flammable* *Explosive*

Skill, experience, and knowledge make a safe worker in the field. Know and observe the following guidelines:

1. Never smoke while applying herbicides.
2. Avoid inhaling sprays or dusts. Wear protective clothing and respirator. Additional detail on personal protective equipment is provided below.
3. Sprayer lines carrying herbicide must not enter the operator's cab.
4. Have soap, water and towel available. Should concentrated product spill on skin, hands, face or eyes, wash immediately.
5. Wash hands and face when leaving the treated area, before break periods, lunch, or for comfort.
6. Bath or shower and change to clean clothing after working with herbicides. Wash clothing each day before re-use.
7. Call a physician or get the patient to a hospital immediately if symptoms of illness occur during or shortly after herbicide application. Be sure to take along the product label or container.
8. Store herbicides out of the reach of children.
9. Store herbicides where there is no chance of contact with human food or livestock feeds. Do not store herbicides with insecticides, and avoid cross-contamination.
10. Keep chemicals in their original containers, never in unmarked containers or bottles used for food or drink.
11. Never fill spray tanks directly from a potable water source such as a well or dugout.
12. Follow proper container disposal methods. All containers should be triple rinsed or pressure rinsed, punctured to render the container nonreusable, and delivered to designated disposal sites.

Personal Protective Equipment for Herbicide Users

The use of personal protective equipment is an integral but often neglected facet of safety in the handling and application of pesticides, including herbicides. The wearing of a respirator, proper eye shields (goggles), gloves, foot wear, and other protective clothing is recommended.

Chemical Cartridge Respirator

Dust masks are ineffective in protecting against herbicide vapours. Similarly, the filters on tractor cabs are intended to remove dust and are not designed to protect against herbicide vapours or mists. Chemical cartridge respirators are recommended for outdoor use when mixing and applying herbicides.

Only NIOSH approved respirators should be used. Do not interchange component parts of respirators. For example, do not use a cartridge produced by company "A" with a respirator produced by company "B" as the combination may not provide adequate protection to the user.

When carrying out spray operations, filters should be changed each day, and the cartridges should be replaced when chemical odour becomes apparent or when breathing becomes difficult. New cartridges should always be installed at the start of the spraying season. Prior to commencing work, the face seal should be checked while the respirator is on the wearer's face. It should be noted that regardless of design, respirators cannot be worn securely by people wearing beards, moustaches or sideburns.

Contact any of the supply companies listed below or the Department of Environment and Workplace Health and Safety for information on respiratory protection against specific herbicides.

Eye Protection

The use of protective goggles is necessary and recommended when a full face mask is not worn.

Many goggles are chemical resistant, some have specially treated lenses to reduce fogging, others have anti-fogging ventilation. Prescription type safety spectacles are also available to which side shields can be attached, when necessary.

Gloves

Non-absorbent gloves should be worn at all times while handling, mixing and applying herbicides. Neoprene has been found superior to rubber in resisting the absorptive penetration of many substances associated with herbicides.

Other factors to be considered in selecting suitable gloves include sense of touch, wet grip, cut resistance, and abrasion resistance. Gloves should fit snugly. Fabric wrist gloves should not be considered.

Footwear

Non-absorbent footwear should be worn when applying herbicides.

For emergency situations, such as herbicide spills, suitable protective footwear should be available. It is suggested that the most suitable boot is one that is knee length, acid and solvent resistant, and cleated or ribbed to prevent slippage. Neoprene is considered much superior to rubber in withstanding various acids and solvents.

Other Clothing

A major concern in agricultural herbicide spraying is the unwillingness of the applicator to wear some form of protective clothing, particularly under warm summer conditions. At the very least, coveralls should be worn along with gloves and a hat to minimize the hazard of dermally toxic herbicides. The clothing should be changed and washed regularly following spraying.

Disposable garments suitable for herbicide work are now available. Made of "Tyvek" polyethylene fibres, such clothing will provide protection against dermal exposure resulting from pesticide drift, splashing, or spills. Light-weight and economical, disposal garments are available as coveralls, shirts and pants, headcovers, and aprons.

Supplies of goggles, prescription type safety spectacles, neoprene gloves, and boots and other protective clothing including hats are available from any one of the major safety supply companies listed below.

Availability

Many pesticide dealers stock personal protective equipment for herbicide users. In addition, a number of safety supply companies carry out business in Manitoba providing a wide range of products. Some firms offer complete lines, others specialize. The following companies are in a position to meet the needs of herbicide users:

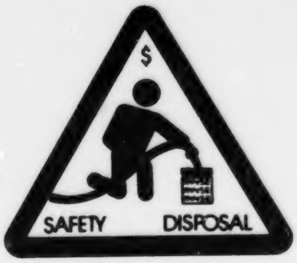
- IPACO Safety Products
- Levitt - Safety Limited
- Mackay Morton Limited
- MSA Canada Incorporated
- McVicar Safety Supplies Limited
- Safety Centre Limited
- Safety Supply Canada

Check the Telephone Directory Yellow Pages for addresses and branch locations.

IN CASE OF ACCIDENT OR POISONING WITH ANY PESTICIDE, CONTACT YOUR LOCAL HOSPITAL. FOR FURTHER INFORMATION, CONTACT:

POISON CONTROL
HEALTH SCIENCES CENTRE
CHILDREN'S CENTRE
685 BANNATYNE AVENUE
WINNIPEG, MANITOBA, R3E 0W1
TELEPHONE: 1-787-2591

Herbicide Container Disposal



RINSE for dollar$
RINSE for safety
RINSE for disposal

This logo and slogan promotes the advantages of rinsing used herbicide containers.

RINSING saves dollar$; the user gets all the product they paid for.

RINSING is for safety since residues remaining in unrinsed containers can be potential health and environmental hazards.

RINSING is for disposal to reduce environmental contamination caused by open dumping of unwanted herbicide containers.

Triple Rinsing

Triple rinsing renders used pesticide containers (metal, plastic, glass) more than 99.9% free of residues in most cases.

Here are the steps that should be followed:

1. Empty contents of the container into the spray tank and drain in a vertical position for 30 seconds.
2. Add a measured amount of rinse water or other diluent so container is about 1/5 full.
3. Rinse the container thoroughly and pour the rinsate into the spray tank.
4. Repeat the procedure three times, it should only take about 5 minutes in total.
5. Triple rinsed containers should be punctured or broken to render them non-reusable. Paper bags should be rinsed once prior to disposal.

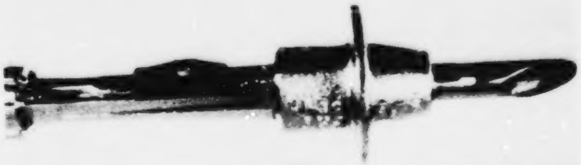
Pressure Rinsing

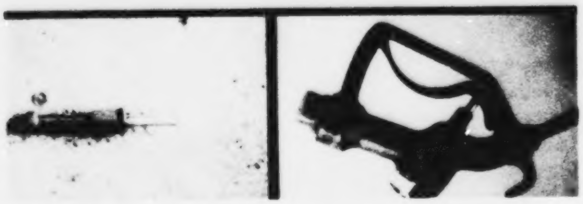
Various pressure rinsers are available which have the versatility to rinse all sizes of empty pesticide containers that can be lifted into position over the spray nozzle.

A 30 second rinse with any of these pressure rinsers is convenient and just as effective as triple rinsing.

The pressure rinsers are all constructed to be thrust into the bottom of a metal can or plastic jug. Holes, situated laterally in the rinser tip, direct water from a pressurized source onto the inner sides of the container and effectively wash the residual pesticide into the spray tank.

Some farmers have found it convenient to attach a rinser to the pump on their large water storage tank to minimize container handling.





Pressure rinsers have the added advantage of rendering containers useless by automatically puncturing them.

Disposal of Containers

Properly rinsed containers should be delivered to a designated pesticide container disposal site. Contact your Ag Rep or Weed Supervisor for the locations of pesticide container disposal sites in your municipality.

Local Ag Rep or Weed Supervisor Phone Numbers

Ag Rep Office	Phone Number
Altona	324-6871
Arborg	376-5212
Ashern	768-2686
Beausejour	268-1411
Boissevain	534-2461
Brandon	728-5724
Carberry	834-3349
Carman	745-2005
Dauphin	638-9111
Dugald	853-2051
Ethelbert	742-3779
Fisher Branch	372-6526
Gladstone	385-2856
Hamiota	764-2767
Killarney	523-4510
Lundar	762-5649
Melita	522-3256
Minnedosa	867-3961
Morden	822-5461
Morris	746-2312
Neepawa	476-2311
Pilot Mound	825-2858
Portage La Prairie	857-9711
Roblin	937-2158
Russell	773-2043
St. Pierre	433-7749
Ste. Rose Du Lac	447-2116
Selkirk	482-3922
Shoal Lake	759-2394
Somerset	744-2013
Souris	483-2153

Ag Rep Office	Phone Number
Starbuck	735-2478
Steinbach	326-9841
Stonewall	467-5511
Swan River	734-3417
Teulon	886-2696
The Pas	623-6411
Treherne	723-2626
Virden	748-3873
Vita	425-3436

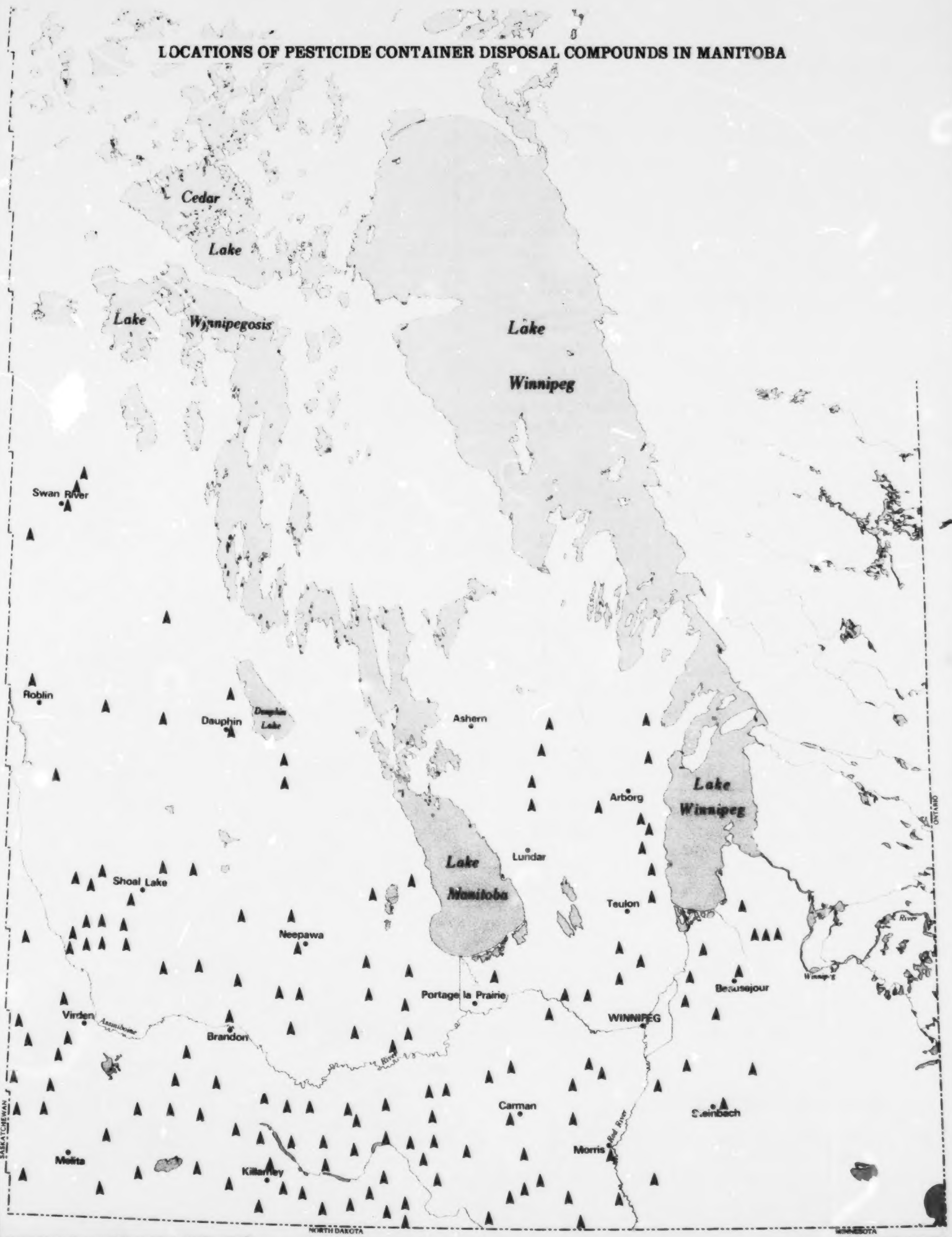
Weed Supervisor

R.M. or L.G.D.	Phone Number
Albert	877-3768
Alexander	268-1411
Argyle	744-2049
Armstrong	376-2939
Arthur	634-2419
Bifrost	376-2939
Blanshard	764-2128
Brenda	747-2586
Brokenhead	268-1411
Cameron	858-2590
Cornwallis	727-0467
Dauphin	638-7050
Desalaberry	433-7265
Edward	634-2419
Fisher	376-2939
Franklin	427-2158
Gilbert Plains	548-2061
Gimli	376-2939
Grandview	546-2639
Hamiota	764-2128
Hanover	326-3922
Hillsburg	937-2158
La Broquerie	326-3922
Lac Du Bonnet	268-1411
Langford	476-5162
Lorne	744-2049
Louise	873-2103
MacDonald	736-2331
Miniota	764-2128
Montcalm	746-2571
Morris	746-2571
North Cypress	834-2195
North Norfolk	685-2050
Ochre River	638-7050
Park (N)	937-2158
Pembina	242-2681
Piney	425-3436
Pipestone	877-3768
Reynolds	426-2110
Richot	883-2293
Riverside	523-4205
Roblin	529-2363
Rockwood	467-2256
Rosedale	476-5162
Rosser	467-2256
St. Andrews	482-3922
Ste. Anne	326-3922
St. Clements	482-3922
Shell River	937-2158
Sifton	858-2590
South Cypress	827-2602
South Norfolk	723-2626
Springfield	853-2051
Stanley	822-3940
Stuartburn	425-3436
Tache	853-2051
Thompson	822-3940
Turtle Mountain	523-4205
Victoria	526-2423
Wallace	748-3873
Westbourne	385-2856
Whitemouth	348-2949
Winchester	747-2586
Woodworth	764-2128

Field Sprayer Recommendations

- Do not use air blast or air mist sprayers to apply herbicides.
- Do not spray in winds above 20 km/h (12 mph).
- Avoid using nozzle pressures above 45 psi (300 kPa).
- Use a minimum of 45 L/acre water for all herbicides unless otherwise specified for the product.
- Do not spray when the wind is blowing towards a nearby sensitive crop, shelterbelt or garden.
- Avoid spraying in a dead calm near sensitive plants.
- Do not use end nozzles for field spraying. Use them only for areas inaccessible to the spray boom, and only when winds are very light.
- Select nozzles that will produce uniform patterns, correct application rates and low drift hazards. For most conditions, 80° flat fan nozzles produce a better combination of pattern uniformity and drift control than do flooding nozzles, 65° or 73° flat fan nozzles, or cone nozzles.

LOCATIONS OF PESTICIDE CONTAINER DISPOSAL COMPOUNDS IN MANITOBA


Cedar Lake
Lake Winnipegosis
Lake Winnipeg
Swan River
Roblin
Dauphin
Dauphin Lake
Ashern
Arborg
Lake Winnipeg
Lake Manitoba
Lundar
Teulon
Shoal Lake
Neepawa
Beausejour
Portage la Prairie
Virden
Assiniboine
Brandon
WINNIPEG
River
Winnipeg
River
Carman
Steinbach
Red River
Morris
Melita
Killarney
SASKATCHEWAN
ONTARIO
NORTH DAKOTA
MINNESOTA

Cartography by: Surveys and Mapping Branch, Manitoba 1984 ©

Province of Manitoba 1979

The Metric System

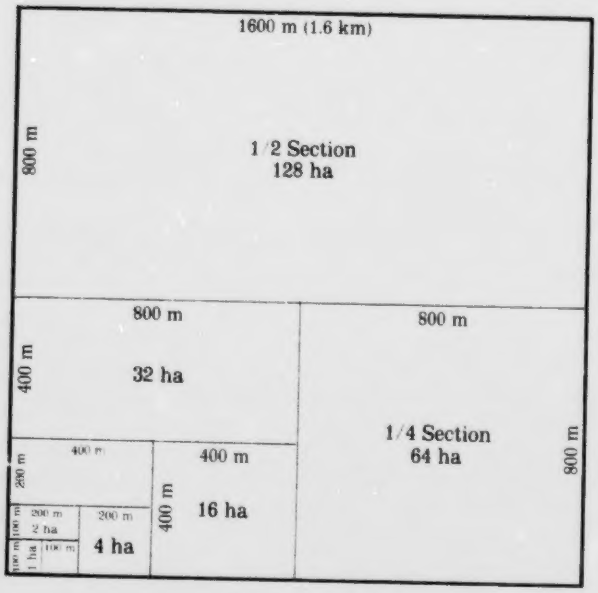
The Pest Control Products Act of Canada requires herbicide labels to be in metric units. Since labels are metric, use of metric units can help prevent confusion.

Acres to Hectares

Acres can be converted to hectares by dividing acres by 2.5, or by using the following chart.

To use the chart go down the acre range column to the correct range and then across to the exact acre figure. For example, if field size is 49.0 acres, go down to the 40 - 49 range and across to the 9 column. The answer is 19.6 hectares. This can be rounded to 20 hectares.

For field sizes over 100 acres, start with 40 hectares for each 100 acres and use the chart for the remaining acres. For example, if field size is 149.0 acres, start with 40 hectares and add 19.6 from the chart to get a final answer of 59.6 or 60 hectares.



Acre Range	0	1	2	3	4	5	6	7	8	9
0 - 9	0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6
10 - 19	4.0	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6
20 - 29	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6
30 - 39	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6
40 - 49	16.0	16.4	16.8	17.2	17.6	18.0	18.4	18.8	19.2	19.6
50 - 59	20.0	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.2	23.6
60 - 69	24.0	24.4	24.8	25.2	25.6	26.0	26.4	26.8	27.2	27.6
70 - 79	28.0	28.4	28.8	29.2	29.6	30.0	30.4	30.8	31.2	31.6
80 - 89	32.0	32.4	32.8	33.2	33.6	34.0	34.4	34.8	35.2	35.6
90 - 99	36.0	36.4	36.8	37.2	37.6	38.0	38.4	38.8	39.2	39.6

1 acre = 0.4 hectare

1 hectare = 2.5 acres

1 ha = 10 000 m^2

Figure 1 indicates field sizes in relation to a section of land. A section contains 256 hectares (640 A) and is 1600 metres (1 mile) by 1600 metres (1 mile). To save time insert the number of hectares in each field on a field map.

Product Required

Label rates on herbicide containers are given as product per hectare. Multiply the rate by field size in hectares to determine product requirements. Divide by container size to determine the number of containers required. The same procedure is used for determining amount of product required for each sprayer tank once you know hectares covered by each tank.

NOTE: In this Guide rates are given as product per **ACRE**. Multiply the rate by the field size in acres to determine product requirements. Divide by container size to determine the number of containers required. The same procedure is used for determining amount of product for each sprayer tank once you know acres covered by each tank.

Example 1 (liquid) Field size is 30 hectares (75 A). Rate of application is 2 litres/hectare (0.81 L/A). Each pail contains 20 litres.

$\frac{2\ \text{L/ha} \times 30\ \text{ha}}{20\ \text{L}} = 3$ pails $\frac{0.81\ \text{L/A} \times 75\ \text{A}}{20\ \text{L}} = 3$ pails

Example 2 (granular) Field size is 20 hectares (50 A). Rate of application is 10 kg/ha (4.05 kg/A). Each bag contains 25 kilograms product.

$\frac{10\ \text{kg/ha} \times 20\ \text{ha}}{25\ \text{kg}} = 8$ bags $\frac{4.05\ \text{kg/A} \times 50\ \text{A}}{25\ \text{kg}} = 8$ bags

Metric Conversion Factors

Symbols

Length

mm - millimetre
cm - centimetre
m - metre
km - kilometre

Area

m^2 - square metre
ha - hectare

Weight

mg - milligram
g - gram
kg - kilogram
t - tonne

Volume

mL - millilitre
L - litre
m^3 - cubic metre

Pressure

kPa - kilopascal

Temperature

°C - degree Celsius

Relationships

Length

10 mm = 1 cm
100 cm = 1 m
1000 m = 1 km

Area

10 000 m^2 = 1 ha

Weight

1000 mg = 1g
1000 g = 1 kg
1000 kg = 1 t

Volume

1000 mL = 1 L
1000 L = 1 m^3

Length

1 in = 2.54 cm
1 ft = 0.3048 m
1 yd = 0.914 m
1 mile = 1.609 km
1 m = 1.09 yd
1 m = 3.28 ft

Area

1 sq in = 6.452 cm^2
1 sq ft = 0.093 m^2
1 sq yd = 0.836 m^2
1 acre = 0.4047 ha
1 sq mile = 256 ha
1 ha = 2.47A (round to 2.5 in most cases)
1 m^2 = 10.8 ft^2
1 m^2 = 1.2 yd^2

Weight

1 oz = 28.35 g
1 lb = 0.4536 kg
1 ton = 0.907 t
1 kg = 2.20 lbs

Volume

1 fl oz = 28.41 mL
1 fl oz (US) = 29.57 mL
1 pint = 0.568 L
1 quart = 1.137 L
1 gal = 4.546 L
1 US gal = 3.785 L
1 cu in = 16.387 cm^3
1 cu ft = 0.028 m^3
1 cu yd = 0.765 m^3
1L = 0.88 qt
1L = 0.22 gal
1 m^2 = 35.71 ft^3
1 m^3 = 1.31 yd^3

Proportion

1 fl oz/acre = 70.21 mL/ha
1 oz/acre = 70.06 g/ha
1 lb per acre = 1.121 kg/ha
1 lb/in^2 (psi) = 6.895 kPa
1 pint/acre = 1.40 L/ha
1 qt/acre = 2.81 L/ha
1 gal/acre = 11.23 L/ha
1 kg/ha = 0.89 lb/A
1 L/ha = .089 gal/acre

Temperature

°C = 5/9 (°F - 32)
°F = 9/5 °C + 32

NOTE: *The Manitoba Agriculture factsheet Metric Units for Herbicide Use contains additional information.*

Approximate Conversions

acres	*hectares*
1	0.4
2.5	1
5	2
10	4
15	6
20	8
25	10
30	12
40	16
50	20
60	24
75	30

gallons	*litres*
100	450
110	500
150	700
200	900
220	1000
250	1100
300	1400
330	1500
350	1600
400	1800
440	2000
500	2300

gallons per acre	*litres per acre*	*litres per hectare*
4	18	45
4.5	20	50
5	22	55
9	40	100
10	45	110
13.5	60	150
15	70	170
18	80	200
20	90	220
50	220	550

psi	*kPa*
15	100
20	150
25	175
30	200
35	250
40	275
45	300
50	350

U.S. gallons	*litres*
100	380
200	760
300	1140
400	1510
500	1890
600	2270

ounces per **acre**	*grams per* **acre**	*grams per* **hectare**
1	28	70
2	61	150
4	111	275
6	172	425
8	223	550
10	283	700
12	344	850

pounds per acre	*kilograms per acre*	*kilograms per hectare*
0.90	0.405	1.00
1.00	0.45	1.10
1.25	0.61	1.50
1.50	0.71	1.75
1.75	0.81	2.00
2.00	0.91	2.25
2.70	1.21	3.00
3.00	1.32	3.25
4.00	1.82	4.50
4.50	2.02	5.00
6.00	2.73	6.75
9.00	4.05	10.00
10.00	4.45	11.00
25.00	11.1	27.50

NOTE: *The chart inside the front cover of this Guide provides rate conversions from L or kg/ha to L or kg/acre.*

Tank Mixes

A tank mix involves the purchase of two chemicals separately and mixing them in the sprayer tank, as opposed to a mixture formulated by the manufacturer. For example, wild oat herbicides are frequently tank mixed with other products to control a wide range of weeds.

Crop injury and reduced weed control are the main difficulties encountered when herbicides are tank mixed. Physical compatability of the mixture must also be considered.

When herbicides for grassy weed control are mixed with herbicides for control of broadleaf weeds, a partial loss of activity on wild oats is common. When reduced weed control is likely to occur, the advantages of tank mixing are soon lost. For example, a loss of five to ten per cent in wild oat control is usually more costly than a second spraying of the field. The Manitoba Agriculture fact sheet *Tank Mixing Postemergent Wild Oat Herbicides* provides detailed information on reductions in wild oat control which may occur as a result of tank mixing with various broadleaf herbicides.

The order in which the herbicides are added to the spray tank may be critical in avoiding physical incompatabilities. When mixing herbicides to be applied in one operation, first mix one with the quantity of water to be used and agitate before the second is added. To reduce the possibility of formation of precipitates or gums which may clog nozzles and filters, add herbicides to the spray tank in the following order:

1. soluble powders
2. wettable powders and flowable liquids
3. solutions (amines and salts)
4. additives (surfactants)
5. emulsifiable concentrates (esters)

For specific mixing instructions always check the product label as there may be exceptions to the mixing order.

CAUTION: *Use tank mixes only when registered and recommended for use. Other mixtures may not be effective, may injure the crop, or may leave a harmful residue in the treated crop.*

Field Crops

Cereals

NOTE: *See the Field Crops Chart at back of the Guide for a summary of recommended herbicides and weeds controlled by each product.*

Barley

TABLE 1. SUMMARY OF BARLEY RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, green and yellow	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow Cockle	Cocklebur	Flixweed	Hemp Nettle	Kochia	Lamb's Quarters	Mustard, Wild	Pigweed, Red Root	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Stinkweed	Thistle, Sow (Perennial)	Thistle, Canada
Avadex BW	E			G																		
Avadex BW + Rival Treflan Triflurex	E		G	G																		
Afolan Lorox + MCPA	F		P		G		G		G	G	E[1]	F	G	E	E	G		E[1]	F	E	P[2]	P[2]
Avenge 200 C	G			G																		
Avenge 200 C + Bromox 720 M Buctril M Sabre	G			G	E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Avenge + Estaprop	G			G	G					G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Avenge 200 C + MCPA ester 2,4-D ester	G			G						G	E[1]			E	E		G[3]	E[1]		E[1]	P[2]	P[2]
Avenge 200 C + Pardner Torch DS	G			G	G	P			G	F			F	G	F	F	G		G	F[1]		
Banvel + MCPA 2,4-D	F				G	G		G	G	G	E[1]	F[4]	G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Blagal	G				G		G				G[1]	F		E	E			G[1]	G	G[1]	P[2]	P[2]
Bromox 720 M Buctril M Sabre	E				E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Carbyne 2 EC	G			P																		
DyVel	F				G	G		G	G	G	E[1]	F	G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Estaprop	G				G					G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Hoe-Grass 284[5]	G	G	G	G																		
Hoe-Grass II[5]	G	G	G	G	G	P			G				F	G	F	F	G		G	F[1]		
Hoe-Grass II[5] + MCPA amine	G	F	F	F	G	P			G				F	G	F	F	G		G	F[1]		
Hoe-Grass 284[5] + Pardner Torch DS	G	G	G	G	G	P			G	F			F	G	F	F	G		G	F[1]		
Kil-Mor	F				G	G		G	G	G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Lexone Sencor[5]	F					G	G					F		G	G	F	G		G	G[1]		
Lexone Sencor[5] + 2,4-D amine MCPA	F					G	G				E[1]	F		E	E	G	G	E[1]	G	E[1]	P[2]	P[2]
Lexone Sencor[5] + Banvel	F				G	G	G		G			F		G	G	G	G		G	G[1]	F[2]	F[2]
MCPA	E									G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
MCPAK	E									G	E[1]	F		E	E			E[1]		E[1]	P[2]	P[2]
Pardner Torch DS	E				G	P			G	F			F	G	F	F	G		G	F[1]		
Pardner Torch DS + MCPA 2,4-D	E				E	F			G	G	G[1]	F[4]	G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Rival Treflan Triflurex	E		G																			
Rival 10 G Treflan QR 5	F	G	G	F	F		G		G					G		G	G					
Stampede 360	F		F		G									G		G		F[1]	G	F[1]		
Stampede 360 + MCPA ester	F		G		G						G[1]		F	E	G	G		G[1]	G	G[1]		
Stampede CM	F		G		G						G[1]		F	E	G	G		G[1]	G	G[1]		
Target	F				G	G		G	G	G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
TCA	F		F																			
TCA + MCPA 2,4-D	F		F							G	E[1]			E	E		G[3]	E[1]		E[1]	P[2]	P[2]
TCA + Buctril M	F		F		E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Tordon 202 C	G				G					G	E[1]			E	E	G	G	E[1]	G	E[1]	P[2]	P[2]
2,4-D	G									G	E[1]			E	E		G	E[1]		E[1]	P[2]	P[2]

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Use 2,4-D for Russian thistle control.

[4] MCPAK only.

[5] Check text for varietal restrictions.

Preplant / Preemergence Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats. Apply rate recommended in fall or before seeding in the spring.

	ORGANIC MATTER		
	Less than 2%	**2 - 4%**	**Greater than 4%**
Fall Granular	4.45 kg/acre	5.67 kg/acre	6.88 kg/acre
Spring Granular	5.67 kg/acre	5.67 kg/acre	6.88 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.42 L/acre	1.42 L/acre	1.72 L/acre

*Although registered for fall application the application and incorporation requirements for the liquid formulation predisposes soils to erosion and its use in the fall is not recommended.

The granular formulation is more suited to fall applications, the liquid to spring applications. The liquid product should be applied in 45 L/acre water. Use a suitable granular applicator to apply the granular product. Refer to the *Herbicide Incorporation* section for application and incorporation instructions.

Fall application of the granular product must be made after September 15 but before soil freeze-up. Applications made before September 15 may result in reduced effectiveness of the herbicide.

Application can also be made after seeding but wild oat control will generally be less than with earlier applications especially if the soil is dry.

Avadex BW liquid can also be tank mixed with Rival, Treflan or Triflurex. The tank mixture can only be applied after seeding barley.

The liquid product may be applied with liquid fertilizer as a carrier, or sprayed on dry urea fertilizer. Refer to the *Herbicide Incorporation* section for incorporation instructions.

Avadex BW Granular may be applied by air. See Aerial Recommendations for Field Crops. (Table 12).

Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500 g/L), Treflan EC (545 g/L), Triflurex (400 g/L) Controls green and yellow foxtail. Apply recommended rate in at least 45 L/acre of water to a trash free surface after seeding but prior to crop emergence.

	SOIL TEXTURE	
	light and medium soils	**heavy soils**
Rival	0.49 L/acre	0.65 L/acre
Treflan EC	0.45 L/acre	0.61 L/acre
Triflurex	0.57 L/acre	0.85 L/acre

Barley must be seeded to a depth of 2 to 3 inches (5 to 7.5 cm). Incorporate as soon as possible after application (within eight hours) with a tyne or diamond harrow operated at a speed of 8 km/h (5 mph) or greater. A second incorporation must be done at right angles to the first within 24 hours of application. Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Rival, Treflan or Triflurex can also be tank mixed with Avadex BW liquid. The tank mixture can only be applied after seeding. Rival, Treflan or Triflurex may be applied in liquid fertilizer (i.e. 28-0-0). See *Liquid Fertilizer Mixes* section.

Rival 10 G (10%), Treflan QR 5 (5%) Caution: Severe barley injury may occur if soil conditions are not conducive to rapid barley emergence. Fall application only. Controls green and yellow foxtail and several broadleaf weeds. Suppression of wild oats and wild buckwheat. *See Table 1 and Field Crops Chart.*

Apply recommended rate according to soil texture and organic matter content.

	SOIL TEXTURE				
	light texture 2–4% organic matter	**medium and heavy texture 2–4% organic matter**	**light texture 4-6% organic matter**	**medium and heavy texture 4–6% organic matter**	**heavy texture 6–10% organic matter**
Rival 10 G	not recommended*	3.44 kg/acre*	not recommended*	4.45 kg/acre*	5.67 kg/acre*
Treflan QR 5	not recommended*	8.9 kg/acre*	not recommended*	11.3 kg/acre*	not recommended

*The two fall incorporations required may leave soils vulnerable to wind or water erosion and is not recommended on light textured soils.

Refer to *Herbicide Incorporation Section* for application and incorporation instructions. To minimize injury be sure not to overapply or overlap Rival 10 G or Treflan QR 5. Exceeding recommended rates will result in severe reductions in crop stand. Do not apply on grey-wooded soils or other soils containing less than 2% organic matter. Do not apply Treflan QR 5 on soils containing more than 6% organic matter. Applications to eroded knolls will result in reduced crop stand. Since application rate is dependent on soil types do not apply to fields having variable soil types or organic matter contents. This condition usually exists in hilly terrain. Rival 10 G and Treflan QR 5 leave a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Caution: Stresses such as seedling disease, cold weather, deep seeding, excessive moisture, high salt concentration or drought weaken crop seedlings and increase the risk of damage from Rival 10 G and Treflan QR 5.

To reduce the risk of crop injury:

1. Seed the crop into a warm, moist, firm seedbed no deeper than 5 cm (2 inches).
2. Do not apply Rival 10 G or Treflan QR 5 to land treated with Rival, Treflan or Triflurex during the previous 18 months.

3. Both incorporations of Rival 10 G or Treflan QR 5 must be done in fall.
4. Seeding should be with a press drill or hoe drill.
5. Use of discers and air seeders can result in uneven emergence due to the loose seedbed and variable seeding depth. If they are used for seeding barley the field should be packed after seeding to give a firm seedbed.
6. Do not seed when soil conditions are cold.
7. Do not use on fields with variable soil texture and/or organic matter contents.
8. Only apply in fall and do not exceed rates recommended for specific soil textures and organic matter contents.
9. Do not use liquid formulations as severe injury to barley will result.

Treflan EC see Rival.

Treflan QR 5 see Rival 10 G.

Triflurex see Rival.

Postemergence

Afolan F (450 g/L) or Lorox L (480 g/L) plus MCPA amine Controls several broadleaf weeds and suppresses green foxtail. See *Table 1 and Field Crops Chart.* Tank mix 0.19 to 0.251 L/acre Afolan F with 0.45 L/acre MCPA amine (500 g/L) or 0.172 to 0.223 L/acre of Lorox L with 0.34 to 0.453 L/acre MCPA amine (500 g/L). For product volumes of other MCPA amine formulations refer to Table 14. Apply in 45 L/acre water at a pressure of 30 to 40 psi (225 to 275 kPa) when the weeds are in the one to four leaf stage (green foxtail in the one to three leaf stage) and the crop is in the two to four leaf stage. Hemp nettle must be treated before the full four leaf stage. Use 50 mesh screens in the filter and nozzles. Use the lower rates when growing conditions and rainfall are above average. For mixing, fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Empty container and hold in vertical position for 30 seconds. Rinse container with water, again shaking vigorously and letting drain for 30 seconds. Repeat this procedure for a total of three rinsings to ensure that all product has been transferred to the sprayer tank. Add the required amount of MCPA amine and finish filling the tank with water while agitating. Spray solution as soon as possible after mixing. Do not use formulations of MCPA other than the amine or crop injury may result. Do not graze or feed green plants to livestock.

Avenge 200 C (200 g/L) Controls wild oats. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate of application if the wild oat population is greater than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (276 kPa). Direct nozzles to spray at a 45° angle in the direction of travel. Apply to a dry crop (no dew or rain) before barley is past the six leaf stage, when wild oats are in the three to five leaf stage. Avoid grazing for eight weeks after application. Do not apply if rain is forecast within six hours. Avenge may be tank mixed with Estaprop, MCPA ester, 2,4-D LV ester, Bromox 720 M, Buctril M, Sabre, Pardner or Torch DS. Avenge 200-C may be applied by floater-type equipment but the use of postemergent boom kits, equipped with flat fan nozzles which deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph) is recommended. Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200-C may be applied with a Spra-Coupe, provided adequate water volume is used and speed is reduced to 16 to 20 km/h (10 to 12 mph). Calibrate equipment to apply at least 16 to 20 L/acre of the solution at a minimum of 45 psi (300 kPa) pressure. Avenge 200-C may be applied by air. See *Aerial Recommendations for Field Crops.* (Table 12)

Banvel (480 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply at 0.093 L/acre, tank mixed with the amine or potassium salt formulations of MCPA or amines of 2,4-D at 0.344 L/acre of products containing 500 g/L 2,4-D or MCPA. For product volumes of other MCPA or 2,4-D formulations refer to Table 14. Use a minimum spray volume of 45 L/acre water. Banvel may be applied from the two to the five leaf stage. If the crop is growing under stress conditions apply at the two to three leaf stage for optimum crop safety. Banvel may be applied by air. See Aerial Recommendations for Field Crops (Table 12).

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Bar-fox see TCA.

Blagal (375 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 0.91 L/acre in 45 L/acre water at a minimum pressure of 40 psi (275 kPa). Blagal should be applied to actively growing weeds in the two to five leaf stage (hemp nettle two to four leaf stage), and when the crop is in the two to five leaf stage. If the crop is under stress (lack of moisture or extremes in temperature) a temporary yellowing of the lower crop leaves may occur. Do not apply Blagal to weeds in the cotyledon stage. For best results on Canada thistle the application should be delayed until the crop is in the five leaf stage. Do not use flood jet nozzles. Only 50 mesh metal filters and nozzle screens should be used. If the spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Rainfall within four hours after application will reduce the effectiveness of the Blagal treatment.

Bromox 720 M (720 g/L) Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.*
Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. These treatments will give some top growth control of Canada thistle and perennial sow-thistle but regrowth can be expected. Barley can be sprayed safely until the early shot blade stage but weeds will not be adequately controlled once the crop shields the weeds.

Bromox 720 M, Buctril M and Sabre can be applied by air. See Table 12.

Buctril M see Bromox 720 M.

Carbyne 2 EC (240 g/L) Carbyne is registered for wild oat control in barley. See product label for application details. For best results Carbyne must be applied when wild oats are in the one to two leaf stage. Vigorous crop competition is necessary to suppress the remaining wild oats. To improve control with Carbyne apply only at the higher registered rates of 0.61 to 0.71 L/acre.

DyVel (420 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart*. Apply at 0.51 L/acre in a minimum of 45 L/acre water and travelling at a speed of 6 to 8 km/h (4 to 5 mph). Hemp nettle, corn spurry and cow cockle must be treated before the full four leaf stage. DyVel may be applied from the two to the five leaf stage of barley. If the crop is growing under stress conditions, apply at the two to three leaf stage for optimum crop safety.

Estaprop (600 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart*. Apply 0.71 L/acre in a minimum of 45 L/acre water. Spray when the crop is in the four leaf to shot blade stage. Best control is obtained when the weeds are in the two to four leaf stage.

Glean (75%) Although Glean is registered for postemergence broadleaf weed control in barley, **use of Glean is not recommended in Manitoba**. Glean residues in the soil may persist and affect subsequent crops for 3 or more years following application.

Persistence of Glean is affected by the pH of the soil. Glean is registered for use only on soils having a pH of 7.5 or less. If Glean has been used on soils having a pH of less than 7.5, only wheat may be seeded the year following the Glean application. If the soil pH is 7.0 or less either wheat or barley may be seeded the year following the Glean application. Few soils in Manitoba are below pH 7.0.

Either wheat or barley may be seeded the second season (22 months or longer) following the last Glean application. Crops other than wheat or barley may be injured by Glean residues 3 or more years following Glean application. These restrictions severely limit cropping opportunities on Glean treated fields.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply at 1.01 L/acre in at least 45 L/acre water with 80° flat fan nozzles directed 45° forward and travelling at a speed of 6 to 8 km/h (4 to 5 mph). Apply when weeds are in the one to four leaf stage and before tillering.

Hoe-Grass 284 must be applied in the 1 to 4 leaf stage of barley and before tillering (stooling). Application beyond this stage will result in crop damage. Certain environmental conditions should be avoided when applying Hoe-Grass 284 on barley, i.e. prolonged cool, humid periods, drought and frost. Application of Hoe-Grass 284 is not recommended to Norbert, Glenn, Klages and Betzes varieties since these varieties are especially sensitive to Hoe-Grass 284 under these environmental conditions.

Hoe-Grass 284 at a rate of 1.13 L/acre may be tank mixed with 0.405 L/acre Pardner or 0.253 L/acre of Torch DS to control weeds susceptible to these products. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard. When applying broadleaf herbicides other than Pardner or Torch DS, allow at least four days after the application of Hoe-Grass 284.

Do not apply if rain is expected within one hour after application. Hoe-Grass 284 should not be mixed with insecticides, other than Decis, fungicides, fertilizers, or any other chemicals or additives (except Pardner, or Torch DS). When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F)), dry conditions or when humidity is low) when plants are not actively growing may result in significantly reduced weed control. For aerial recommendations see Table 12.

Hoe-Grass II (310 g/L) Controls wild oats, green and yellow foxtail, and several broadleaf weeds. See *Table 1 and Field Crops Chart*. Apply 1.42 L/acre in not less than 45 L/acre water with 80° flat fan nozzles directed 45° forward.

Apply when wild oats, foxtail and barnyard grass are in the one to four leaf stage and before tillering, when Russian thistle is up to 2 inches (5 cm) in height and when other broadleaf weeds are up to the early four leaf stage.

Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard.

Hoe-Grass II at a rate of 1.42 L/acre may be tank mixed with MCPA amine 500 at 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control. Application of the Hoe-Grass II plus MCPA amine 500 mixture should be avoided under stress conditions (i.e. prolonged drought, excessive day time temperature and/or low humidity) as severe reductions in**

grassy weed control will result. Strong crop competition is required for satisfactory weed control.

Hoe-Grass II must be applied in the one to four leaf stage of barley and before tillering (stooling). Application beyond this stage will result in crop damage. Certain environmental conditions should be avoided when applying Hoe-Grass II on barley, i.e. prolonged cool, humid periods, drought and frost. Application on Norbert, Glenn, Klages and Betzes barley is not recommended since these varieties are especially sensitive to Hoe-Grass under these environmental conditions.

Do not apply Hoe-Grass II if rain is expected within one hour. Application of Hoe-Grass II by aircraft is not recommended.

Do not tank mix Hoe-Grass II with any insecticides other than Decis, fungicides, fertilizer or chemical additive (except MCPA amine 500) as a reduction in weed control will result.

Kil-mor (500 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 0.344 L/acre in 45 L/acre water. Apply when weeds are actively growing and are in the two to three leaf stage. Spray barley at the two to three leaf stage for optimum crop safety.

Lexone DF (75%), Lexone L (480 g/L), Sencor 500 (500 g/L) Sencor 75 DF (75%) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.*
Apply:

Lexone DF	0.109 to 0.142 kg/acre
Lexone L	0.172 to 0.223 L/acre
Sencor 500	0.111 to 0.223 L/acre
Sencor 75 DF	0.081 to 0.152 kg/acre

Apply in 45 L/acre water when barley is in the two to five leaf stage. Use the higher rate when weed infestation is heavy and to improve residual control of chickweed.

Lexone L, Lexone DF or Sencor 500 may be tank mixed with 0.34 to 0.453 L/acre MCPA amine (500 g/L), or Sencor may be tank mixed with 0.34 to 0.453 L/acre 2,4-D amine (500 g/L), to add control of top growth of Canada thistle and other MCPA or 2,4-D susceptible weeds. Apply at the three to four leaf stage of the crop. For product volumes of other MCPA amine or 2,4-D amine formulations, see Table 14.

Lexone L, Lexone DF or Sencor 500 at the low rate may be tank mixed with 0.093 L/acre Banvel (480 g/L) to add control of Canada thistle and wild buckwheat. Use this tank mix when barley is in the two to three leaf stage.

Sencor 500 at 0.111 L/acre may be used for control of stinkweed, volunteer rapeseed and wild mustard only.

Temporary (seven to ten days) lightening in crop color and a slight reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within one or two days after application. Do not apply Lexone or Sencor for four to five days after a frost. Allow a five day interval between applications of Lexone or Sencor and wild oat herbicides. Do not apply Lexone or Sencor if rain is expected within six hours. Do not apply within 60 days of harvest. Do not graze or feed crop to livestock within 30 days of application.

Klondike variety of barley is less tolerant to Lexone and Sencor than other barley varieties. Refer to product labels for specific application instructions and restrictions.

CAUTION: *To avoid crop injury, barley must be planted at least 2 inches (5 cm) below the soil surface.*

Lorox see Afolan.

MCPA amine, sodium salt, sodium potassium salt mixtures or ester. Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water when the crop is in the two leaf to early shot blade stage. For product volumes of other MCPA formulations refer to Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

MCPAK (400 g/L) Controls hemp nettle and other MCPA susceptible weeds. See *Table 1 and Field Crops Chart.* Apply at 0.85 L/acre in 45 L/acre water when the crop is in the three to six leaf stage and when the weeds are in the one to four leaf stage. Treat hemp nettle before the full four leaf stage. If buckwheat and smartweed are present, tank mix MCPAK at 0.405 L/acre with Banvel or at 0.55 L/acre with Pardner or Torch DS. For aerial recommendations see Table 12.

NaTA TCA see TCA.

Pardner (280 g/L), or Torch DS (450 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.*
Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage and after the crop reaches the two leaf stage, but before it shields the weeds. Use the higher rate to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Wild mustard will not be controlled beyond the 3 leaf stage. If a wide range of leaf stages are present at the time of spraying a tank mix with MCPA or 2,4-D is recommended to obtain adequate control of wild mustard. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be tank mixed with MCPA or 2,4-D at 0.227 to 0.34 L/acre of formulations containing 500 g/L MCPA or 2,4-D to improve control of more advanced weeds. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be mixed with 0.283 to 0.55 L/acre of MCPAK, to improve control of hemp nettle. For product volumes of other MCPA or 2,4-D formulations see Table 14. Do not use 2,4-D mixtures before the four leaf stage of barley.

CAUTION: ***Pardner is available at two different strengths. Consult the product label to confirm that***

correct rates have been chosen for the product concentration being used.

Sabre see Bromox 720 M.

Sencor see Lexone.

Stampede 360 (360 g/L) + MCPA ester Controls green and yellow foxtail and several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 1.11 L/acre Stampede 360 in a tank mix with 0.223 L/acre MCPA ester (500 g/L) in 45 L/acre water. For product volumes of other MCPA formulations see Table 14. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than 1 inch (2.5 cm) tall. The crop must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop, particularly under dry conditions. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede 360 is a contact herbicide and thorough spray coverage is required for best results. Do not apply if rain is expected within one hour. Do not tank mix Stampede 360 with other pesticides, liquid fertilizers or additives. Maintain a three day interval between application of Stampede 360 and other herbicides. Do not apply Stampede 360 in fields in which atrazine has been applied during the previous two years.

The following insecticides are the only products registered for safe use in the same year that Stampede 360 is applied. Furadan may be used on barley if applied 10 days or longer after an application of Stampede 360. For Dimethoate (Cygon) or Malathion, allow 14 days after an application of Stampede 360. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede 360.

Stampede 360 may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Do not leave spray solution in sprayer tank overnight.

Stampede 360 is also registered for application without MCPA. Spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Stampede CM (460 g/L) Controls green and yellow foxtail and several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 1.11 L/acre in 45 L/acre water. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. The crop must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop, particularly under dry conditions. Effects are temporary and new growth will be normal. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede CM is a contact herbicide and thorough spray coverage is required for best results. Do not apply if rain is expected within one hour. Do not tank mix Stampede CM with other pesticides, liquid fertilizers or additives. Maintain a three day interval between application of Stampede CM and other herbicides. Do not apply Stampede CM in fields in which atrazine has been applied during the previous two years.

The following insecticides are the only products registered for safe use in the same year that Stampede CM is applied. Furadan may be used on barley if applied 10 days or longer after an application of Stampede CM. For Dimethoate (Cygon) or Malathion, allow 14 days after an application of Stampede CM. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede CM.

Stampede CM may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Do not leave spray solution in sprayer tank overnight.

Target (400 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 0.405 to 0.61 L/acre in 45 L/acre water. Apply when barley is in the two to three leaf stage. Apply when weeds are actively growing and are in the two to five leaf stage. Use the higher rate if weeds are in the three to five leaf stage, under adverse weather conditions or when weed density is high.

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 0.81 L/acre TCA Solution or 0.54 kg/acre product Bar-fox or NaTA TCA in 45 L/acre water, when the crop is in the two to four leaf stage and before foxtail reaches the three leaf stage. Some delay in barley maturity may occur. Since TCA acts primarily through the soil there will be variations in control with different soil moisture conditions. Avoid overlapping. Do not apply on barley seeded less than 2 inches (5 cm) deep. NaTA TCA may be tank mixed with MCPA amine, 2,4-D amine or Buctril M. Bar-fox may be tank mixed with Estemine MCPA or Estemine 2,4-D. TCA Solution may be tank mixed with MCPA ester or Buctril M. If 2,4-D is used in the mixture apply at the four leaf stage of the crop. To dissolve TCA, gradually pour Bar-fox or NaTA TCA into the spray tank with agitation in operation. Ensure 10 litres or more of water is in the tank for each kilogram of material to be dissolved, prior to slowly pouring in the product. If 2,4-D, MCPA or Buctril M is to be used, add the TCA to the tank first.

Torch DS see Pardner.

Tordon 202C (212 g/L) Controls several broadleaf weeds. See *Table 1 and Field Crops Chart.* Apply 0.81 L/acre in 45 L/acre water at the three to five leaf stage of barley. Some regrowth of Canada thistle may be expected.

CAUTION: *Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Fallow or replant to wheat, barley, oats, flax or rapeseed for two years following treatment.*

Due to the length of recropping restrictions the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.

2,4-D amine or LV ester Controls several broadleaf weeds. See *Table 1 and Field Crops Chart*. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water when the crop is in the four leaf to early shot blade stage. For product volumes of other 2,4-D formulations, see Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

For barley underseeded to forage crops see *Forage Crops* section.

Oats

Postemergence

Afolan F (450 g/L) or Lorox L (480 g/L) plus MCPA amine Controls several broadleaf weeds and gives suppression of green foxtail. See *Field Crops Chart*. Tank mix 0.19 to 0.251 L/acre Afolan F with 0.445 L/acre MCPA amine (500 g/L) or 0.172 to 0.223 L/acre of Lorox L with 0.34 to 0.453 L/acre MCPA amine (500 g/L). For product volumes of other MCPA amine formulations refer to Table 14. Apply in 45 L/acre water when the weeds are in the one to four leaf stage. Use 50 mesh screens in the filter and nozzles. Use the lower rates when growing conditions and rainfall are above average. For mixing, fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Empty container and hold in vertical position for 30 seconds. Rinse container with water, again shaking vigorously and letting drain for 30 seconds. Repeat this procedure for a total of three rinsings to ensure that all product has been transferred to the sprayer tank. Add MCPA amine immediately after adding the required amount of Afolan F or Lorox L. Finish filling the tank with water while agitating. Spray solution as soon as possible after mixing.

Do not use formulations of MCPA other than the amine or crop injury may result. Apply when oat crop is in the two to four leaf stage. Do not graze or feed green plants to livestock.

Banvel (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart*. Apply at 0.093 to 0.117 L/acre tank mixed with the amine, potassium, or sodium salt formulations of MCPA at 0.344 L/acre of products containing 500 g/L MCPA. For product volumes of other MCPA formulations see Table 14. Use the higher rate if weeds are past the seedling stage (two to four leaf) and for cleaver control. Banvel may be applied to oats from the two to the five leaf stage. If the crop is growing under stress conditions, apply at the two to three leaf stage for optimum crop safety. Use a minimum spray volume of 45 L/acre. Do not treat after the five leaf stage of growth. Banvel may be applied by air. See Table 12.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Bar-fox see TCA.

Blagal (375 g/L) Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.91 L/acre in 45 L/acre water at a minimum pressure of 40 psi (275 kPa). Blagal should be applied to actively growing weeds in the two to five true leaf stage (hemp nettle two to four leaf stage), and when the crop is in the two to four leaf stage. If the crop is under stress because of lack of moisture or extremes in temperature a temporary yellowing of the lower crop leaves may occur. Do not apply Blagal to weeds in the cotyledon stage. For best results on Canada thistle the application should be delayed until the crop is in the five leaf stage. Do not use lood jet nozzles. Only 50 mesh metal filters and nozzle screens should be used. If the spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Rainfall within four hours after application will reduce the effectiveness of the Blagal treatment.

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Field Crops Chart*.
Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. These treatments will give some top growth control of Canada thistle and perennial sow-thistle but regrowth can be expected. Oats can be sprayed safely until the early shot blade stage. However, weeds will not be adequately controlled once the crop shields the weeds.

Bromox 720 M, Buctril M and Sabre can be applied by air. See Table 12.

Buctril M see Bromox 720 M.

DyVel (420 g/L) Controls several broadleaf weeds. See *Field Crops Chart*. Apply at 0.51 L/acre in a minimum of 45 L/acre of water. Spray at the two to three leaf stage for optimum crop safety. Do not treat oats after the five leaf stage of growth. Hemp nettle, corn spurry and cow cockle must be treated before the full four leaf stage.

Glean (75%) Although registered for postemergence broadleaf weed control in oats, **use of Glean is not recommended in Manitoba**. Glean residues in the soil may persist and affect subsequent crops for three or more years following application.

Persistence of Glean is affected by the pH of the soil. Glean is registered for use only on soils having a pH of 7.5 or less. If Glean has been used on soils having a pH of less than 7.5, only wheat may be seeded the year following the Glean application. If the soil pH is 7.0 or less either wheat or barley may be seeded the year following Glean application. Few soils in Manitoba are below pH of 7.0.

Either wheat or barley may be seeded the second season (22 months or longer) following the last Glean application. Crops other than wheat or barley may be injured by Glean residues three or more years following Glean application. These restrictions severely limit cropping opportunities on Glean treated fields.

Kil-mor (500 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Apply at 0.344 to 0.445 L/acre in 45 L/acre water. For best results apply when weeds are actively growing and are in the two to five leaf stage. Use the higher rate if weeds are between the three to five leaf stage, under adverse weather conditions, or if weed density is high. Spray when the crop is in the three to four leaf stage.

Lorox see Afolan.

MCPA amine, sodium salt, sodium potassium salt mixtures or ester. Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water when the crop is in the two leaf to early shot blade stage. For product volumes of other MCPA formulations refer to Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

MCPAK (400 g/L) Controls hemp nettle and other MCPA susceptible weeds. See *Field Crops Chart.* Apply at 0.85 L/acre in 45 L/acre of water when the crop is in the three to six leaf stage and when the weeds are in the one to four leaf stage. Treat hemp nettle before the full four leaf stage. If buckwheat and annual smartweed species are present, tank mix MCPAK at 0.405 L/acre with Banvel or at 0.55 L/acre with Pardner or Torch DS. For aerial recommendations see Table 12.

NaTA TCA see TCA.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre of water when weeds are at the two to four leaf stage and after the crop reaches the two leaf stage but before it shields the weeds. Use higher rates to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying a tank mix with MCPA would be advisable to obtain adequate control of wild mustard. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be tank mixed with MCPA at 0.223 to 0.34 L/acre of formulations containing 500 g/L. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be tank mixed with 0.283 to 0.55 L/acre MCPAK to improve control of hemp nettle. For product volumes of various MCPA formulations see Table 14.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Sabre see Bromox 720 M.

Stampede 360 (360 g/L) + MCPA ester Controls green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart.* Apply 1.11 L/acre Stampede 360 in a tank mix with 0.223 L/acre MCPA ester (500 g/L) in 45 L/acre water. For product volumes of other MCPA formulations see Table 14. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than 1 inch (2.5 cm) tall. The crop must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop, particularly under dry conditions. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede 360 is a contact herbicide and thorough spray coverage is required for best results. Use only flat fan nozzles that provide 45 L/acre output.

Do not tank mix Stampede 360 with other pesticides, liquid fertilizers or additives. Maintain a three day interval between application of Stampede 360 and other herbicides. Do not apply Stampede 360 in fields in which atrazine has been applied during the previous two years. Dimethoate (Cygon) and malathion are the only insecticides registered for safe use in the same year that Stampede 360 is applied and should not be applied until 14 days or longer after the application of Stampede 360. Crops treated from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede 360.

Do not apply if rain is expected within one hour. Do not leave spray solution in sprayer tank overnight.

Stampede 360 may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Stampede 360 is also registered for application without MCPA. Spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Stampede CM (460 g/L) Controls green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart.* Apply 1.11 L/acre in 45 L/acre water. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. The crop must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop particularly under dry conditions. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede CM is a contact herbicide and thorough spray coverage is required for best results. Use only flat fan nozzles.

Do not tank mix Stampede CM with other pesticides, liquid fertilizers or additives. Maintain a three day interval between application of Stampede CM and other herbicides. Do not apply Stampede CM in fields in which atrazine has been applied during the previous two years. Dimethoate (Cygon) and malathion are the only insecticides registered for safe use in the same year that Stampede CM is applied and should not be applied until 14 days or longer after the application of Stampede CM. Crops treated from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede CM.

Do not apply if rain is expected within one hour. Do not leave spray solution in sprayer tank overnight.

Stampede CM may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Target (400 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.405 to 0.61 L/acre in 45 L/acre water. Apply when oats are in the two to five leaf stage. Apply to actively growing weeds in the two to five leaf stage. Use the higher rate if weeds are in the three to five leaf stage, under adverse weather conditions or when weed density is high.

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 0.81 to 1.52 L/acre TCA Solution or 0.54 to 1.08 kg/acre product Bar-fox or NaTA TCA in 45 L/acre water, when the crop is in the two to four leaf stage and before foxtail reaches the three leaf stage. Some delay in oat maturity may occur. Since TCA acts primarily through the soil, there will be variations in control with different soil and moisture conditions. Avoid overlapping. Do not apply on oats seeded less than 2 inches (5 cm) deep. NaTA TCA may be tank mixed with MCPA amine or Buctril M. TCA Solution may be tank mixed with MCPA ester or Buctril M. Bar-fox may be tank mixed with Estemine MCPA. NaTA TCA or TCA Solution may be tank mixed with Pardner plus MCPA. To dissolve TCA, gradually pour Bar-fox or NaTA TCA into the spray tank with the agitation in operation. Ensure 10 litres or more of water is in the tank for each kilogram of material to be dissolved prior to slowly pouring in the product. If Pardner, MCPA or Buctril M is used, add TCA to the tank first.

Torch DS see Pardner.

For oats underseeded to forage crops see Forage Crops Section.

Rye

Spring or Fall

Postemergence

Avenge 200 C (200 g/L) *(use on Cougar, Puma, Frontier, Rymin and Kodiak only)* Controls wild oats. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square meter). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in direction of travel. Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage and before crop is past the six leaf stage.

Avoid grazing or feeding treated material for eight weeks after application. Do not apply if rain is forecast within six hours. Do not tank mix Avenge 200 C with broadleaf herbicides on rye. Avenge 200-C may be applied by floater-type equipment. The use of postemergence boom kits, equipped with flat fan nozzles, is recommended. Pressure should be 40 psi (276 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200-C may be applied with a Spra-Coupe, provided adequate water volume is used and speed is reduced to 16 to 20 km/h (10 to 12 mph). Calibrate equipment to apply at least 16 to 20 L/acre of the solution under at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Banvel (480 g/L) *(Spring rye only)* Controls several broadleaf weeds. See *Field Crops Chart.* Apply at 0.093 to 0.117 L/acre tank mixed with the amine formulation of 2,4-D (500g/L) at 0.344 L/acre. For product volumes of other 2,4-D formulations refer to Table 14. Use a minimum of 45 L/acre water. Spray at the two to three leaf stage for optimum crop safety. Do not treat rye after the three leaf stage of growth.

Banvel may be applied by air. See Table 12.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Bromox 720M (720g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. This treatment will give some top growth control of Canada thistle and perennial sow thistle but rapid regrowth can be expected. Rye can be sprayed safely from the time growth commences in the spring until the early shot blade stage. However, weeds will not be adequately controlled once the crop shields the weeds.

Buctril M see Bromox 720 M.

Hoe-Grass 284 (284 g/L) Controls green and yellow foxtail, wild oats and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Use 80° flat fan nozzles directed 45° forward and travel at a speed of 6 to 8 km/h (4 to 5 mph). Apply when weeds are in the one to four leaf stage, and before they tiller. Allow an interval of at least four days after the application of Hoe-Grass 284 when applying other herbicides. Do not apply if rain is expected within one hour. Hoe-Grass 284 should not be tank mixed with insecticides, fungicides, fertilizers, or any other chemicals or additives. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Application of Hoe-Grass during periods of stress (above 28°C (82°F), dry conditions or when humidity is low) when plants are not actively growing may result in significantly reduced weed control.

Hoe-Grass II (310 g/L) (Spring rye only) Controls wild oats, green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart.* Apply 1.42 L/acre in not less than 45 L/acre water with 80° flat fan nozzles directed 45° forward.

Apply when wild oats, foxtail and barnyard grass are in the one to four leaf stage and before tillering, when Russian thistle is up to 2 inches (5 cm) in height and other broadleaves are up to the early four leaf stage.

Wild mustard will not be controlled beyond the 3 leaf stage. If a wide range of leaf stages are present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard.

Hoe-Grass II at a rate of 1.42 L/acre may be tank mixed with MCPA amine 500 at 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA 500 will result in a severe reduction in grassy weed control. Application of the Hoe-Grass II plus MCPA amine 500 mixture should be avoided under stress conditions (i.e. prolonged drought, excessive daytime temperatures and/or low humidity) as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control.**

Do not tank mix Hoe-Grass II with any other herbicide, insecticide, fungicide, fertilizer or chemical additive as a reduction in weed control will result.

Do not apply Hoe-Grass II if rain is expected within one hour. Application of Hoe-Grass II by air is not recommended.

MCPA amine, sodium salt, sodium potassium salt mixtures or ester. Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water when spring rye is in the two leaf to early shot blade stage, or when fall rye commences growth in the spring, until the early shot blade stage. For product volumes of other MCPA formulations refer to Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present reduce the rate of MCPA (500 g/L) to 0.34 L/acre. For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) (spring application only) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. Fall rye may be sprayed until the flag leaf stage but weeds will not be adequately controlled if they are shaded by the crop. Use the higher rate to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at spraying wild mustard control will be variable.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Sabre see Bromox 720 M

2,4-D amine or LV ester Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water when the crop is in the four leaf to early shot blade stage. Only a few brands of 2,4-D are registered for application in the fall. For product volumes of other 2,4-D formulations refer to Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

For rye underseeded to forage crops see Forage Crops section.

Triticale

Postemergence

Avenge 200 C (200 g/L) *(use on Welsh and Carman only)* Controls wild oats. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square meter). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in direction of travel. Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage and before crop is past the six leaf stage. Avoid grazing or feeding treated crop for eight weeks after application. Do not apply if rain is forecast within six hours. Do not tank mix Avenge 200 C with broadleaf herbicides on triticale. Avenge 200-C may be applied by floater-type equipment. The use of postemergent boom kits, equipped with flat fan nozzles, is recommended. Pressure should be 40 psi (276 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200-C may be applied with a Spra-Coupe, provided adequate water volume is used and speed is reduced to 16 to 20 km/h (10 to 12 mph). Calibrate equipment to apply at least 15 to 20 L/acre of solution under at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Hoe-Grass 284 (284 g/L) Controls green and yellow foxtail, wild oats and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Use 80° flat fan nozzles directed 45° forward. Travel at a speed of 6 to 8 km/h (4 to 5 mph). Apply when weeds are in the one to four leaf stage, and before they tiller. Do not apply if rain is expected within one hour.

Hoe-Grass 284 at a rate of 1.13 L/acre may be tank mixed with Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre to control weeds susceptible to these products. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at spraying wild mustard control will be variable.

Hoe-Grass II (310 g/L) Controls wild oats, green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart*. Apply 1.42 L/acre in not less than 45 L/acre water with 80° flat fan nozzles directed 45° forward.

Apply when wild oats, foxtail and barnyard grass are in the one to four leaf stage and before tillering, when Russian thistle is up to 2 inches (5 cm) in height and other broadleaves are up to the early four leaf stage.

Wild mustard will not be controlled beyond the 3 leaf stage. If a wide range of leaf stages are present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard.

Hoe-Grass II at a rate of 1.42 L/acre may be tank mixed with MCPA amine 500 at 0.028 L/acre to improve wild mustard control. ***Caution: Exceeding the recommended rate of MCPA 500 will result in a severe reduction in grassy weed control.*** Application of the Hoe-Grass II plus MCPA amine 500 mixture should be avoided under stress conditions (prolonged drought, excessive daytime temperatures and/or low humidity) as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control.

Do not tank mix Hoe-Grass II with any other pesticides, fertilizers or chemical additives as a reduction in weed control will result.

Do not apply Hoe-Grass II if rain is expected within one hour. Application of Hoe-Grass II by air is not recommended.

Mataven (84 g/L) Mataven L (52.5g/L) Controls wild oats. Apply 2.02 L/acre in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of wild oats are in the three to six leaf stage. Do not apply to triticale after the six leaf stage. When wild oat infestations are heavy, treatment at the early stage (three to four leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (four to six leaf), will provide more complete control of late emerging wild oats.

Do not mix Mataven or Mataven L with broadleaf herbicides. To avoid reduced control of wild oats an interval of four days is required between Mataven or Mataven L and Pardner or Torch DS applications. For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Field Crops Chart*.

Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage and after triticale reaches the two leaf stage but before it shields the weeds, or reaches the early flag leaf stage. Use the higher rate to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at spraying, wild mustard control will be variable.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Wheat, Spring and Durum

TABLE 2. SUMMARY OF WHEAT RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, yellow & green	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Shepherd's purse	Smartweed, annual species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Avadex BW	G			G																		
Avadex BW + Rival/Treflan/Triflurex	E		G	G																		
Afolan or Lorox + MCPA	F		P		G		G		G	G	E[1]	F	G	E	E	G		E[1]	F	E[1]	P[2]	P[2]
Avenge 200 C[5]	G			G																		
Avenge 200 C[5] + Bromox 720 M/Buctril M/Sabre	G			G	E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Avenge 200 C[5] + Estaprop	G			G	G					G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Avenge 200 C[5] + MCPA ester or 2,4-D ester	G			G						G	E[1]			E	E		G[3]	E[1]		E[1]	P[2]	P[2]
Avenge 200 C[5] + Pardner/Torch DS	G			G	G	P			G	F			F	G	F	F	G		G	F[1]		
Banvel + MCPA or 2,4-D	G				G	G		G	G	G	E[1]	F[4]	G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Blagal	G				G		G				G[1]	F		E	E			G[1]	G	G[1]	P[2]	P[2]
Bromox 720 M/Buctril M/Sabre	E				E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Carbyne 2 EC[5]	G			P																		
DyVel	G				G	G		G	G	G	E[1]	F	G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Estaprop	G				G					G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Hoe-Grass 284	G	G	G	G																		
Hoe-Grass 284 + Pardner/Torch DS	G	G	G	G	G	P			G	F			F	G	F	F	G		G	F[1]		
Hoe-Grass II	G	G	G	G	G	P			G	F			F	G	F	F	G		G	F[1]		
Hoe-Grass II + MCPA amine	G	F	F	F	G	P			G				F	G	F	F	G		G	F[1]		
Kil-Mor	G				G	G		G	G	G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Lexone/Sencor	F					G	G					F		G	G	F	G		G	G[1]		
Lexone/Sencor + MCPA or 2,4-D	F					G	G			G	E[1]	F		E	E	G	G	E[1]	G	E[1]	P[2]	P[2]
Lexone/Sencor + Banvel	F				G	G	G		G			F		G	G	G	G		G	G[1]	F[2]	F[2]
Mataven[5]	E			G																		
MCPA	E									G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
MCPAK	E									G	E[1]	F		E	E			E[1]		E[1]	P[2]	P[2]
Pardner/Torch DS	E				G	P			G	F			F	G	F	F	G		G	F[1]		
Pardner/Torch DS + MCPA/2,4-D	E				E	F			G	G	G[1]	F[4]	G	E	G	G	G[3]	G[1]	G	G[1]	P[2]	P[2]
Rival/Treflan/Triflurex	E		G																			
Stampede 360	F		F		G									G		G		F[1]	G	F[1]		
Stampede 360 + MCPA ester or 2,4-D	F		G		G						G[1]		F	E	G	G	G[3]	G[1]	G	G[1]		
Stampede CM	F		G		G						G[1]		F	E	G	G		G[1]	G	G[1]		
Target	G				G	G		G	G	G	E[1]		G	E	E	G	G	E[1]	G	E[1]	F[2]	F[2]
Tordon 202 C	G				G					G	E[1]			E	E	G	G	E[1]	G	E[1]	P[2]	P[2]
2,4-D	G									G	E[1]			E	E		G	E[1]		E[1]	P[2]	P[2]

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Use 2,4-D for Russian thistle control.

[4] MCPAK only.

[5] Check text for varietal restrictions.

Preplant/Preemergence Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats.

Apply recommended rate in the fall or the spring.

Application	SOIL ORGANIC MATTER		
	Less than 2%	2 - 4%	Greater than 4%
Granular Fall	4.45 kg/acre	5.66 kg/acre	6.87 kg/acre
Granular Spring (before seeding**)	4.45 kg/acre	4.45 kg/acre	5.66 kg/acre
Granular Spring (after seeding)	5.66 kg/acre	5.66 kg/acre	6.87 kg/acre
Liquid Spring (before seeding**)	1.21 L/acre	1.21 L/acre	1.42 L/acre
Liquid Spring (after seeding)	1.42 L/acre	1.42 L/acre	1.72 L/acre

*****Caution:*** *Do not apply Avadex BW before seeding wheat in soils with 4% or less organic matter where discers are to be used for the seeding operation. If an air seeder is to be used, it must be equipped with a depth control device to ensure accurate seed placement otherwise crop injury may occur. Wild oat control may be less consistent with the lower rate of Avadex BW applied prior to seeding in the spring.*

Wheat must be seeded below the treated layer or crop injury will occur. Although Avadex BW liquid is registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and this use is not recommended. The granular formulation is more suited to fall applications and the liquid to spring applications. Apply liquid product in 45 L/acre water. The granular product should be applied with a suitable granular applicator. Refer to the Herbicide Incorporation section for application and incorporation instructions.

Avadex BW liquid at the rate recommended for specific organic matter contents can be tank mixed with Rival, Treflan EC or Triflurex. See Rival, Treflan EC and Triflurex below for recommended rates.

Liquid product may be applied with liquid fertilizer as a carrier, or sprayed on dry urea fertilizer. See *Herbicide Incorporation* section for incorporation instructions.

Avadex BW Granular may be applied by air. See Aerial Recommendations for Field Crops (Table 12).

Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500g/L), Treflan EC (545 g/L), Triflurex (400 g/L) Controls green and yellow foxtail. Apply at recommended rate in at least 45 L/acre water to a trash free surface after seeding but prior to crop emergence.

	Light and Medium Soil Texture	Heavy Soil Texture
Rival	0.49 L/acre	0.65 L/acre
Treflan EC	0.45 L/acre	0.61 L/acre
Triflurex	0.57 L/acre	0.85 L/acre

Wheat must be seeded to a depth of 2 to 3 inches (5 to 7.5 cm). Incorporate as soon as possible after application (within eight hours) with a tyne or diamond harrow operated at a speed of 8 km/h (5 mph) or greater. A second incorporation must be done at right angles to the first within 24 hours of application. Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Rival, Treflan EC or Triflurex can also be tank mixed with Avadex BW liquid. The tank mixture can only be applied after seeding. Rival, Treflan EC, or Triflurex may be applied in liquid fertilizer (i.e. 28-0-0). See *Liquid Fertilizer Mixes* section.

Postemergence

Afolan F (450 g/L) or Lorox L (480 g/L) plus MCPA amine Controls several broadleaf weeds and gives suppression of green foxtail. See *Table 2 and Field Crops Chart.* Tank mix 0.19 to 0.251 L/acre Afolan F with 0.445 L/acre MCPA amine (500 g/L) or 0.172 to 0.223 L/acre of Lorox L with 0.34 to 0.453 L/acre MCPA amine (500 g/L). For product volumes of other MCPA amine formulations see Table 14. Apply in 45 L/acre water at a pressure of 30 to 40 psi (225 to 275 kPa) when the weeds are in the one to four leaf stage (green foxtail in the one to three leaf stage) and the crop is in the two to four leaf stage. Hemp nettle must be treated before the full four leaf stage. Use 50 mesh screens in the filter and nozzles. Use the lower rates if growing conditions and rainfall are above average. For mixing, fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Empty container and hold in vertical position for 30 seconds. Rinse container with water, again shaking vigorously and letting drain for 30 seconds. Repeat this procedure for a total of three rinsings to ensure that all product has been transferred to the sprayer tank. Add the required amount of MCPA amine and finish filling the tank with water while agitating. Spray solution as soon as possible after mixing.

Do not use formulations of MCPA other than the amine or crop injury may result. Do not graze or feed green plants to livestock.

Avenge 200 C (200 g/L) (Use on Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa and Selkirk only). Controls wild oats. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants/square metre). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in direction of travel. Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage. Avoid grazing treated crop for eight weeks after application. If rain is forecast within six hours do not apply. Do not apply to wheat after the six leaf stage. Avenge may be tank mixed with Estaprop, MCPA ester, 2,4-D LV ester, Bromox 720 M, Buctril M, Pardner, Sabre or Torch DS.

Avenge 200-C may be applied by floater-type equipment. The use of postemergent boom kits, equipped with flat fan nozzles, is recommended. Nozzle pressure should be 40 psi (276 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200-C may be applied with a Spra-Coupe, provided adequate water volume is used and speed is reduced to 16 to 20 km/h (10 to 12 mph). Calibrate equipment to apply at least 15 to 20 L/acre of the solution at a minimum of 45 psi (300 kPa) pressure.

For aerial recommendations see Table 12.

Banvel (480 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.093 to 0.117 L/acre tank mixed with the amine or potassium salt formulations of MCPA or amines of 2,4-D at 0.344 L/acre of formulations containing 500 g/L MCPA or 2,4-D. For product volumes of other MCPA or 2,4-D formulations refer to Table 14. Use the higher rate if weeds are past the seedling stage (two to four leaf) and for cleaver control. Banvel may be applied from the two to the five leaf stage. If the crop is growing under stress conditions apply at the two to three leaf stage for optimum crop safety. Use a minimum spray volume of 45 L/acre water. Do not treat after the five leaf stage of growth.

Banvel may be applied by air. See Table 12.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Blagal (375 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.91 L/acre in 45 L/acre water at a minimum pressure of 40 psi (275 kPa). Blagal should be applied to actively growing weeds in the two to five leaf stage (hemp nettle two to four leaf stage). If the crop is under stress (lack of moisture or extremes in temperature) a temporary yellowing of the lower crop leaves may occur. Do not apply Blagal to weeds in the cotyledon stage. For best results on Canada thistle the application should be delayed until the crop is in the five leaf stage. Do not use flood jet nozzles. Only 50 mesh metal filters and nozzle screens should be used. If the spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Rainfall within four hours after application will reduce the effectiveness of the Blagal treatment.

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. *See Table 2 and Field Crops Chart.*

Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. Some top growth control of Canada thistle and perennial sow-thistle will result but regrowth can be expected. Wheat can be sprayed safely until the early shot blade stage but weeds will not be adequately controlled once the crop shields the weeds. Bromox 720 M, Buctril M and Sabre can be applied by air. See Table 12.

Buctril M see Bromox 720 M.

Carbyne 2 EC (240 g/L) Carbyne is registered for wild oat control in wheat. See product label for application details. For best results Carbyne must be applied when wild oats are in the one to two leaf stage. Vigorous crop competition is necessary to supress the remaining wild oats. To improve control with Carbyne apply only at the higher registered rates of 0.61 to 0.71 L/acre.

DyVel (420 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply at 0.51 L/acre in a minimum of 45 L/acre water. DyVel may be applied from the two to the five leaf stage of the crop. If the crop is growing under stress conditions, apply at the two to three leaf stage for optimum crop safety. Do not treat after the five leaf stage of wheat. Hemp nettle, corn spurry and cow cockle must be treated before the full four leaf stage.

Estaprop (600 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.71 L/acre in a minimum of 45 L/acre water. Spray when wheat is in the four leaf to shot blade stage. Best control is obtained when the weeds are in the two to four leaf stage.

Glean (75%) Although registered for postemergence broadleaf weed control in wheat, **use of Glean in Manitoba is not recommended**. Glean residues in the soil may persist and affect subsequent crops for three or more years following application.

Persistence of Glean is affected by the pH of the soil. Glean is registered for use only on soils having a pH of 7.5 or less. If Glean has been used on soils having a pH of less than 7.5, only wheat may be seeded the year following the Glean application. If soil pH is 7.0 or less either wheat or barley may be seeded the year following the Glean application. Few soils in Manitoba are below pH 7.0.

Either wheat or barley may be seeded the second season (22 months or longer) following the last Glean application. Crops other than wheat or barley may be injured by Glean residues three or more years following Glean application. These restrictions severely limit cropping opportunities on Glean treated fields.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply at 1.01 L/acre in at least 45 L/acre water with 80° flat fan nozzles directed 45° forward. Travel at a speed of 6 to

8 km/h (4 to 5 mph). Apply when weeds are in the one to four leaf stage, and before they tiller. Hoe-Grass 284 at a rate of 1.13 L/acre may be tank mixed with 0.405 L/acre Pardner or 0.253 L/acre Torch DS to control weeds susceptible to these products. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying, a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard. When applying broadleaf herbicides other than Pardner or Torch DS, allow at least four days after the application of Hoe-Grass 284. Do not apply if rain is expected within one hour after application. Hoe-Grass 284 should not be mixed with insecticides other than Decis, fungicides, fertilizers, or any other chemicals or additives (except Pardner or Torch DS). When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions or when humidity is low) when plants are not actively growing may result in significantly reduced weed control. For aerial recommendations see Table 12.

Hoe-Grass II (310 g/L) Controls several grassy and broadleaf weeds. *See Table 2 and Field Crops Chart.* Apply 1.42 L/acre in not less than 45 L/acre water with 80° flat fan nozzles directed 45° forward. Travel at a speed of 6 to 8 km/h (4 to 5 mph). Apply when wild oats, green and yellow foxtail, and barnyard grass are in the one to four leaf stage and before tillering, when Russian thistle is up to 2 inches (5 cm) in height and when other broadleaf weeds are up to the early four leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard. Hoe-Grass II at a rate of 1.42 L/acre may be tank mixed with MCPA amine 500 at 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control.** Application of the Hoe-Grass II plus MCPA amine 500 mixture should be avoided under stress conditions (prolonged drought, excessive day time temperature and/or low humidity) as severe reduction in grassy weed control will result. Strong crop competition is required for satisfactory weed control.

Do not tank mix Hoe-Grass II with any other pesticide (except Decis or MCPA amine 500), fertilizer or chemical additive as a reduction in weed control will result. Do not apply Hoe-Grass II if rain is expected within one hour. Aerial application of Hoe-Grass II is not recommended.

Kil-mor (500 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply at 0.344 to 0.445 L/acre in 45 L/acre water. For best results apply when weeds are actively growing and are in the two to five leaf stage. Use the higher rate if weeds are between the three to five leaf stage, under adverse weather conditions, or if weed density is high. Spray when the crop is in the three to five leaf stage for maximum safety. Do not apply after the five leaf stage of wheat or if rain is expected within six hours.

Lexone DF (75%), Lexone L (480 g/L), Sencor 500 (500 g/L), Sencor 75 DF (75%) Controls several broadleaf weeds. *See Table 2 and Field Crops Chart.* Apply:

Lexone DF	0.109 kg/acre
Lexone L	0.172 L/acre
Sencor 500	0.111 to 0.172 L/acre
Sencor 75 DF	0.081 to 0.111 kg/acre

Apply in 45 L/acre water when wheat is in the two to five leaf stage. Use the higher rate when weed infestation is heavy and to improve residual control of chickweed.

Lexone L, Lexone DF or Sencor 500 may be tank mixed with 0.34 to 0.453 L/acre MCPA amine (500 g/L), or Sencor may be tank mixed with 0.34 to 0.453 L/acre 2,4-D amine (500 g/L), to add top growth control of Canada thistle and to control other MCPA or 2,4-D susceptible weeds. Apply at the three to four leaf stage of the crop. For product volumes of other MCPA amine or 2,4-D amine formulations see Table 14.

Lexone L, Lexone DF or Sencor 500 may be tank mixed with 0.093 L/acre Banvel (480 g/L) to control of Canada thistle and wild buckwheat. Apply this tank mix when wheat is in the two to three leaf stage.

Sencor 500 at 0.111 L/acre may be used to control stinkweed, volunteer rapeseed and wild mustard only.

Temporary (seven to ten days) lightening in crop color and a slight reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within one to two days after application. Do not apply Lexone or Sencor for four to five days after a frost. Allow a five day interval between applications of Lexone or Sencor and wild oat herbicides. Avoid applying Lexone or Sencor if rain is expected within six hours.

CAUTION: *Wheat must be planted at least 2 inches (5 cm) below the soil surface.*

Lorox see Afolan.

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats. Apply 2.02 L/acre in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of wild oats are in the three to six leaf stage. Do not apply to wheat after the six leaf stage. Use only on wheat varieties recommended for production in Manitoba (See 1986 Field Crop Variety Recommendations). When wild oat infestations are heavy, treatment at the early stage (three to four leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (four to six leaf), will provide more complete control of late emerging wild oats.

Do not mix Mataven with broadleaf herbicides. To avoid reduced control of wild oats an interval of four days is required between Mataven and Bromox 720 M, Buctril M, MCPA, Pardner, Sabre, or Torch DS applications. An interval of seven days is required between Mataven and other broadleaf herbicides (example, Banvel or 2,4-D). For aerial recommendations see Table 12.

MCPA amine, sodium salt, sodium potassium salt mixtures or ester Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water when wheat is in the two leaf to early shot blade stage. For product volumes of other MCPA formulations see Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

MCPAK (400 g/L) Controls hemp nettle and other MCPA susceptible weeds. See *Table 2 and Field Crops Chart.* Apply at 0.85 L/acre in 45 L/acre of water when weeds are in the one to four leaf stage and when the crop is in the three to six leaf stage. Treat hemp nettle before the full four leaf stage. If buckwheat and annual smartweed species are present, tank mix MCPAK at 0.405 L/acre with Banvel or at 0.55 L/acre with Pardner or Torch DS. For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.*
Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage and after wheat reaches the two leaf stage but before it shields the weeds. Use higher rates to improve control of more advanced weeds but apply before weeds are past the six leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages are present at the time of spraying a tank mix with MCPA or 2,4-D is recommended to obtain adequate control of wild mustard. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be tank mixed with 0.227 to 0.34 L/acre of MCPA and 2,4-D formulations containing 500 g/L MCPA or 2,4-D. Pardner at 0.405 L/acre or Torch DS at 0.253 L/acre may be tank mixed with 0.283 to 0.55 L/acre MCPAK, to improve control of hemp nettle. For product volumes of various MCPA or 2,4-D formulations refer to Table 14. Do not use 2,4-D mixture before the four leaf stage of wheat.

CAUTION: ***Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.***

Sabre see Bromox 720 M.

Sencor see Lexone.

Stampede 360 (360 g/L) + MCPA ester Controls green and yellow foxtail and several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 1.11 L/acre Stampede 360 in a tank mix with 0.223 L/acre MCPA ester containing 500 g/L MCPA in 45 L/acre water using flat fan nozzles. For product volumes of other MCPA formulations see Table 14. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than 1 inch (2.5 cm) tall. The crop must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop, particularly under dry conditions. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede 360 is a contact herbicide and thorough coverage is required for best results. Do not tank mix Stampede 360 with other pesticides (except MCPA ester or 2,4-D), liquid fertilizers or additives. Maintain a three day interval between the application of Stampede 360 and other herbicides. Do not apply Stampede 360 in fields in which atrazine has been applied during the previous two years.

The following insecticides are the only products registered for safe use in the same year that Stampede 360 is applied. Furadan may be used on wheat if applied five days or longer after the application of Stampede 360. For Dimethoate (Cygon) or Malathion allow 14 days after an application of Stampede 360. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede 360.

Do not apply if rain is expected within one hour. Do not leave spray solution in sprayer tank overnight. Stampede 360 may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Stampede 360 is also registered for application without MCPA. Spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Stampede 360 (360 g/L) + 2,4-D amine or 2,4-D LV ester Controls green and yellow foxtail and several broadleaf weeds including Russian thistle. See *Table 2 and Field Crops Chart.* Apply 1.11 L/acre Stampede 360 in a tank mix with 0.324 to 0.486 L/acre 2,4-D LV ester (500 g/L) on spring wheat or 0.324 L/acre 2,4-D LV ester on durum wheat, or with 0.486 L/acre 2,4-D amine on either spring or durum wheat. For product volumes of other 2,4-D formulations see Table 14. Add 2,4-D to spray tank prior to adding Stampede 360. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. The crop must be in the three to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop, particularly under dry conditions. Crop maturity may be effected under conditions of severe stress such as drought or flooding. Stampede 360 is a contact herbicide and thorough coverage is required for best results. Spray early using flat nozzles that provide 45 L/acre output. Do not tank mix Stampede 360 with other pesticides (except MCPA ester or 2,4-D), liquid fertilizers or additives. Maintain a three day interval between the application of Stampede 360 and other herbicides. Do not apply Stampede 360 in fields in which atrazine has been applied during the previous two years.

The following insecticides are the only products registered for safe use in the same year that Stampede 360 is applied. Furadan may be used on wheat if applied 5 days or longer after the application of Stampede 360. For Dimethoate (Cygon) or Malathion allow 14 days after an application of Stampede 360. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede 360.

Do not apply if rain is expected within one hour. Do not leave spray solution in sprayer tank overnight. Stampede 360 may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Stampede 360 is also registered for application without 2,4-D amine or LV ester. Spectrums of broadleaf weeds controlled and effectiveness of green foxtail control will be reduced.

Stampede CM (460 g/L) Controls green and yellow foxtail and several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 1.11 L/acre in 45 L/acre water using flat fan nozzles. Apply at the one to four leaf stage of weeds when the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. Wheat must be in the two to five leaf stage. Leaf discoloration and leaf tip burn may occur on the crop particularly under dry conditions. Effects are temporary and new growth will be normal. Crop maturity may be affected under conditions of severe stress such as drought or flooding. Stampede CM is a contact herbicide and thorough coverage is required for best results. Do not tank mix Stampede CM with other pesticides, liquid fertilizers or additives. Maintain a three day interval between the application of Stampede CM and other herbicides. Do not apply Stampede CM in fields in which atrazine has been applied during the previous two years.

The following insecticides are the only products registered for safe use in the same year that Stampede CM is applied. Furadan may be used on wheat if applied five days or longer after the application of Stampede CM. For Dimethoate (Cygon) or Malathion allow 14 days after an application of Stampede CM. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede CM.

Do not apply if rain is expected within one hour. Do not leave spray solution in sprayer tank overnight. Stampede CM may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used.

Target (400 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.405 to 0.61 L/acre in 45 L/acre water. Apply when wheat is in the two to five leaf stage. Apply when weeds are actively growing and are in the two to five leaf stage. Use the higher rate if weeds are in the three to five leaf stage, under adverse weather conditions or when weed density is high.

Torch DS see Pardner.

Tordon 202 C (212 g/L) Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.81 L/acre in 45 L/acre water at the three to five leaf stage of wheat. Regrowth of Canada thistle may be expected.

CAUTION: *Do not plant fields previously treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Fallow or replant to wheat, barley, oats, flax or rapeseed for two years following treatment.*

Due to the length of recropping restrictions the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.

2,4-D amine or LV ester Controls several broadleaf weeds. See *Table 2 and Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water when wheat is in the four leaf to early shot blade stage. For product volumes of other 2,4-D formulations, check Table 14. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

For wheat underseeded to forage crops see *Forage Crops* section.

Winter Wheat

Avenge 200 C (200 g/L) *(Norstar and Sundance only)* Controls wild oats. Spring application only. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square meter). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at 45° angle in direction of travel. Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage and before crop is past six leaf stage. Avoid grazing or feeding treated crop for eight weeks after application. Do not apply if rain is forecast within six hours. Do not tank mix Avenge 200 C with broadleaf herbicides on winter wheat.

Avenge 200-C may be applied by floater-type equipment. The use of postemergent boom kits equipped with flat fan nozzles is recommended. Pressure should be 40 psi (276 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200-C may be applied with a Spra-Coupe, provided adequate water volume is used and speed is reduced to 16 to 20 km/h (10 to 12 mph). Calibrate equipment to apply at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Banvel (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Spring application only. Apply 0.093 to 0.117 L/acre tank mixed with the amine or potassium or sodium salt formulations of MCPA or amines of 2,4-D at 0.34 L/acre of formulations containing 500 g/L MCPA or 2,4-D. For product volumes of other MCPA or 2,4-D formulations refer to Table 14. Use the higher rate if weeds are past the seedling stage (two to four leaf) and for cleaver control. Apply when the crop is more than 6 inches (15 cm) tall, but before the shot blade stage. Use a minimum spray volume of 45 L/acre water.

Banvel may be applied by air. See Table 12.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. Winter wheat can be sprayed with Buctril M from the two to four leaf stage in the fall or with Bromox 720 M, Buctril M, or Sabre from time growth commences in the spring, until the early shot blade stage, but weeds will not be adequately controlled once the crop shields the weeds. Some top growth control of Canada thistle and perennial sow thistle will result but regrowth can be expected.

Buctril M see Bromox 720 M.

Estaprop (600 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Spring application only. Apply 0.71 L/acre in a minimum of 45 L/acre water. Spray winter wheat after full tillering but before the shot blade stage. Best control is obtained when weeds are in the two to four leaf stage.

Glean (75%) Although registered for postemergence broadleaf weed control in winter wheat, **use of Glean is not recommended in Manitoba**. Glean residues in the soil may persist and affect subsequent crops for three or more years following application.

Persistence of Glean is affected by the pH of the soil. Glean is registered for use only on soils having a pH of 7.5 or less. If Glean has been used on soils having a pH of less than 7.5, only wheat may be seeded the year following the Glean application. If the soil pH is 7.0 or less, either wheat or barley may be seeded the year following the Glean application. Few soils in Manitoba are below pH of 7.0.

Either wheat or barley may be seeded the second season (22 months or longer) following the last Glean application. Crops other than wheat or barley may be injured by Glean residues three or more years following Glean application. These restrictions severely limit cropping opportunities on Glean treated fields.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Spring application only. Apply 1.01 L/acre in at least 45 L/acre water using 80° flat fan nozzles directed 45° forward. Travel at a speed of 6 to 8 km/h (4 to 5 mph). Apply when weeds are in the one to four leaf stage, and before they tiller. Allow an interval of at least four days after the application of Hoe-Grass 284 before applying broadleaf herbicides. Do not apply if rain is expected within one hour after application. Hoe-Grass 284 should not be mixed with insecticides, fungicides, fertilizers or any other chemicals or additives. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions or when humidity is low) when plants are not actively growing may result in significantly reduced weed control.

Kil-Mor (500 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Spring application only. Apply 0.344 to 0.445 L/acre in 45 L/acre water when weeds are actively growing and are in the two to five leaf stage. Use the higher rate if weeds are between the three to five leaf stage, under adverse weather conditions, or if weed density is high. Winter annual weeds should be sprayed early while they are in the rosette stage. Spray before the crop is more than 12 inches (30 cm) high (top leaf extended). Do not apply if rain is expected within six hours.

MCPA amine, sodium salt, sodium potassium salt mixtures or ester. Controls several broadleaf weeds. See *Field Crops Chart.* Spring application only. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water. For product volumes of other MCPA formulations see Table 14. Apply in spring from the time winter wheat commences growth until the early shot blade stage. If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Spring application only.

Apply:

Pardner	0.405 to 0.485 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage. Use the higher rate to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Winter wheat can be sprayed safely until the early shot blade stage but weeds will not be adequately controlled once the crop shields the weeds.

Pardner at 0.405 L/acre may be tank mixed with MCPA (500 g/L) or 2,4-D (500 g/L) at 0.227 to 0.34 L/acre to improve control of more advanced weeds. For product volumes of other MCPA or 2,4-D formulations refer to Table 14.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that* *correct rates have been chosen for the product concentration being used.*

Sabre see Bromox 720 M.

Torch DS see Pardner.

2,4-D amine or LV ester Controls several broadleaf weeds. See *Field Crops Chart*. Spring application only. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water. For product volumes of other 2,4-D formulations see Table 14. Apply in spring after winter wheat is fully tillered but before the early shot blade stage. If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

Other Field Crops

Beans, Dry

To provide broad spectrum weed control it is generally necessary to use a preplant incorporated herbicide plus a preemergence or postemergence herbicide. The following herbicides are recommended for use on navy, black and pinto beans only.

Preplant Incorporated

Eptam 8-E (800 g/L), Eptam 10 G (10%) Controls several grassy and broadleaf weeds. See *Field Crops Chart.* Apply in the spring at 1.72 to 2.23 L/acre or 13.8 to 18.2 kg/acre granular product. Liquid should be applied on a dry soil surface in at least 45 L/acre water. Use a suitable granular applicator for the granular product. Incorporate immediately following instructions in *Herbicide Incorporation* section.

Eptam 8-E may be applied with liquid fertilizer, or on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

Rival (500 g/L), Rival (10 G 10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart.* In general, liquid formulations are best suited for spring application while granular formulations are best suited for fall application.

Spring applications

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

***Application to light textured soils in the fall may predispose fields to wind and water erosion.**

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for susceptible crops.

Preemergence

Sinox PE (360 g/L) Controls wild mustard, stinkweed and volunteer rapeseed. Apply at 6.9 to 8.9 L/acre in 100 to 160 L/acre water. Apply at planting or shortly after, but before the crop emerges.

CAUTION: *Use rubber gloves, goggles and an agricultural respirator when handling Sinox PE.*

Emergence (Crook Stage)

Sinox PE (360 g/L). Controls wild mustard, stinkweed, and volunteer rapeseed. Apply at 3.24 to 5.67 L/acre in 100 to 160 L/acre water. Apply at emergence or shortly after, but not beyond the crook stage. Late application will result in delayed maturity and yield reduction.

CAUTION: *Use rubber gloves, goggles and agricultural respirator when handling Sinox PE.*

Postemergence

Basagran (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Apply to beans after the first trifoliolate leaf stage. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. The addition of Citowett Plus at 2.5 L/1000 L or Assist Oil Concentrate at 5 to 10 L/1000 L spray mixture will improve the control of advanced weeds. Best results are obtained if Basagran is applied under higher temperature conditions (21°C, 70°F). Do not apply if rain is expected within eight hours.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.42 L/acre in 45 L/acre water with a nozzle pressure of 40 psi (275 kPa). Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles directed 45° forward. Do not use flood jet nozzles.

When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used.

Apply at one to four leaf stage of the weeds, before they tiller. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing may result in significantly reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. Do not apply other herbicides until at least four days after Hoe-Grass 284 application.

Buckwheat

Postemergence

Basfapon (74%) Controls green and yellow foxtail. Apply 0.223 to 0.344 kg/acre product in 45 L/acre water. Spray when the foxtail is in the one to three leaf stage. Do not graze or feed to dairy cows or animals being finished for slaughter.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.01 L/acre in 45 L/acre water with a nozzle pressure of 40 psi (275 kPa). Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles directed 45° forward. Do not use flood jet nozzles.

When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used.

Apply at one to four leaf stage of the weeds, before they tiller. Application of Hoe-Grass during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing may result in significantly reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. Do not apply other herbicides until at least 4 days after Hoe-Grass 284 application.

Canary Seed

Postemergence

Avenge 200 C (200 g/L) Controls wild oats. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in direction of travel.

Avenge 200 C may be applied by floater-type equipment. The use of postemergence boom kits equipped with flat fan nozzles is recommended. Nozzle pressure should be 40 psi (276 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control.

Avenge 200 C may be applied with a Spra-Coupe, provided speed does not exceed 16 to 20 km/h (10 to 12 mph) and equipment is calibrated to apply at least 15 to 20 L/acre spray solution under at least 45 psi (300 kPa) pressure.

Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage. Do not apply Avenge 200 C to crops under drought stress. Allow a four day delay between application of Avenge 200 C and other herbicides. Avoid grazing treated crop for eight weeks after application. Do not apply if rain is forecast within six hours. Do not apply after the six leaf stage of the crop. For aerial recommendations see Table 12.

Banvel (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.117 L/acre Banvel tank mixed with 0.344 L/acre of MCPA amine (500 g/L). For product volumes of other MCPA formulations refer to Table 14. Apply in 45 L/acre of water when canary seed is in the three to five leaf stage.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Apply in 45 L/acre water when weeds are in the two to four leaf stage and canaryseed is in the three to five leaf stage. Some top growth control of Canada thistle and perennial sow thistle will result but regrowth can be expected.

Buctril M see Bromox 720 M.

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats. Apply 2.02 L/acre of Mataven or Mataven L in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of the wild oats are in the three to six leaf stage. Direct nozzles forward at a 45° angle. Do not apply to canary seed after the six leaf stage. When wild oat infestations are heavy, treatment at the three to four leaf stage will increase crop yields by reducing competition. Allow four days between application of Mataven and Bromox 720 M, Buctril M, Pardner, Sabre, or Torch DS applications. Allow seven days interval before application of other broadleaf herbicides (eg. Banvel). For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Field Crops Chart.*

Apply:

Pardner	0.405 L/acre
Torch DS	0.253 to 0.304 L/acre

Apply in 45 L/acre water when canary seed is in the three to five leaf stage and weeds are in the two to four leaf stage. Use the higher rate of Torch DS to improve control of more advanced weeds but apply before the weeds are past the six leaf stage. Wild mustard will not be controlled beyond the three leaf stage. If a wide range of leaf stages is present at the time of spraying another broadleaf herbicide should be considered to obtain adequate control of wild mustard.

Sabre see Bromox 720 M.

Stampede CM (460 g/L) Controls green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart*. Apply 1.11 L/acre in 45 L/acre water when the crop is in the two to four leaf stage and the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. Allow three days between application of the treatment and application of other recommended herbicides. Do not apply if rain is expected within one hour. Do not allow the spray solution to stand in the tank overnight. Do not apply to fields which have received an application of atrazine during the previous 26 months.

Torch DS see Pardner.

Caraway

There are no herbicides currently registered in Canada for use in Caraway.

TABLE 3. HERBICIDES FOR CORN

WEEDS / HERBICIDES	Aatrex-Plus/Atra-Mix/[a] Atrazine plus oil	Basagran	Banvel[g]	Banvel plus 2,4-D amine[b]	Bladex[a,e]	Bladex[a,f] + Bio-Veg	Bladex[a] + Dual	Bladex[a] + Eradicane	Bladex[a] + Sutan+	Buctril M	Dual	Eradicane	Eradicane plus Atrazine[a]	Kil-Mor[b]	Laddock	Pardner, Torch DS	Primextra[a]	Sutan+	Sutan+ plus Atrazine[a]	2,4-D[b]
Barnyard Grass	●				●	●	●	●	●		●	●	●				●	●	●	
Cereal Grains	○							●				●	●							
Foxtail, Green	●				●	●	●	●	●		●	●	●				●	●	●	
Foxtail, Yellow	●				●	●	●	●	●		●	●	●				●	●	●	
Wild Oats	●							●				●	●						●	
Quack Grass	S[c]											S	S							
Bindweed, Field		●[d]	□	□										□						□
Blue Bur				●						●				○						●
Buckwheat, Volunteer	○			○						●				●						
Buckwheat, Tartary			●	●						●				●		●				
Buckwheat, Wild	●		●	●	●	●	●	●	●	●			○	●		●	●		●	
Burdock				●										○						●
Catchfly, Night-flowering				○										○		●				
Chickweed		●										●	●		●					
Cleavers			●	●										○						
Cockle, Cow			●	●						●				●		●				
Cocklebur		●		●						●				●	●	●				●
Corn Spurry			●	●											●					
Dandelion																				□
Flixweed				●						●				●						●
Galinsoga, Hairy																				●
Goat's-beard																				●
Goosefoot, Oakleaved					●	●	●	●	●											●
Henbit												●	●							
Knotweed, Prostrate				○	●	●	●	●	●					●						
Kochia	○		●	○						●				○						
Lamb's-Quarters	●	●	●	●	●	●	●	●	●	●			○	●	●	●	●		●	●
Lettuce, Prickly																				●
Mustard, Ball	●		●	●						●				●						●
Mustard, Dog	●		●	●										●						●
Mustard, Hare's-ear	●		●	●										●						●
Mustard, Indian	●		●	●						○				●						●
Mustard, Tame	●		●	○						○				○						○
Mustard, Tumble	●		●	●						●				●						●
Mustard, Wild	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●		●	●
Mustard, Wormseed	●		●	●	●	●	●	●	●	●				●						●
Nightshade					●	●	●	●	●			●	●		●	●				
Pigweed, Prostrate				●						○		●	●	●						
Pigweed, Red Root	●	●	●	●	●	●	●	●	●	●		●	●	●	●		●		●	
Pigweed, Russian				●										○						●
Pigweed, Tumble																				○
Purslane	●	●			●	●	●	●	●			●	●		●		●		●	●
Radish, Wild				●																●
Ragweed, Common	●	●	●	●	●	●	●	●	●	●			●	●	●		●		●	●
Ragweed, False	●		●	●	●	●	●	●	●					●						●
Ragweed, Giant	●	●	●	●										●	●					●
Rapeseed, Volunteer	○			○						●				○						○
Russian-thistle		●		●	●	●	●	●	●	●				●	●	●				●
Shepherd's Purse				●	●	●	●	●	●	●				●						●
Annual Smartweed Species, Lady's Thumb	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●		●	
Sow Thistle (Annual)				●						○				●						●
Sow Thistle (Perennial)			□	□										□						□
Spurge, Thyme-leaved																				●
Stinkweed	○			●						●				●		●				●
Sunflower, Prairie				○						○				○						○
Sunflower, Volunteer				○						●				○						S
Sweet Clover, White	●			●										○					●	○
Thistle, Canada		□[d]	□	□										□						□

LEGEND

- ● Controlled by rates recommended for corn. Where two or more brand names are recommended, the weed may not appear on all labels.
- ○ Not labelled for control but adequate control can be expected.
- S Suppression.
- □ Top growth control only.

[a] These treatments may remain as a residue in the soil the following year. Flax, peas, triazine tolerant canola and fababeans are more tolerant crops. See comments in corn section for specific instructions.

[b] Apply as an overall spray until corn is 6 inches (15 cm) tall with leaf outstretched. After this stage use a directed spray. When using the 0.69 L/acre rate of formulations containing 500 g/L 2,4-D, use only as a directed spray to avoid crop injury. For equivalent product volumes of other 2,4-D formulations see Table 14.

[c] Use a split application of 1.82 L/acre of liquid formulations containing 500 g/L atrazine or 1.01 kg/acre of wettable powder formulations containing 90 per cent atrazine, preplant incorporated, followed by the same rate of atrazine with oil early postemergence. For equivalent weights or volumes of other atrazine formulations see Table 13. See product label for application instructions.

[d] Split applications required for adequate control.

[e] Use under irrigated conditions only.

[f] Apply postemergence. Use Bladex 80 W only.

[g] Apply as an overall spray until corn is 12 inches (30 cm) tall with leaf outstretched. After this stage use a directed spray.

CAUTION: *Any treatments containing atrazine leave a residue in the soil which may affect the subsequent crop. For rotational corn, non-residual treatments are preferred to allow cropping flexibility. Triazine tolerant canola is tolerant to residues from field applications of atrazine. Flax, peas, and fababeans have some tolerance and are usually not affected by rates of up to 0.9 L/acre of liquid formulations containing 500 g/L atrazine or 0.5 kg/acre of wettable powder formulations containing 90 per cent atrazine applied in the previous crop year. If rates exceed 0.9 L/acre of formulations containing 500 g/L atrazine or 0.5 kg/acre of wettable powder formulations containing 90 per cent atrazine, then atrazine may affect these tolerant crops the following year, and more susceptible crops may be affected for two to three years after application. Corn or triazine tolerant canola is recommended to follow these higher rates of atrazine. For equivalent volumes or weights of other atrazine formulations, see Table 13.*

Bladex may leave a residue in the soil. Plant only corn, cereals, potatoes, flax, rapeseed (Canola), triazine tolerant canola, sunflowers, soybeans or peas the year following Bladex application. Carryover will be greater on clay and clay loam soils and under dry conditions. Residue carryover following repeated applications of Bladex (two or more consecutive years) has not been fully evaluated and could result in damage to more sensitive crops such as rapeseed (Canola), sunflowers or cereals.

To reduce the levels of residue in the soil, atrazine or Bladex may be applied in a band instead of as a broadcast treatment, so the overall rate of application is reduced. Thorough mixing of the treated soil after the cropping year will result in a reduction of the residue problem.

Proso millet is becoming an increasing problem in corn, especially where continuous corn production is practiced. Eradicane has some activity in suppressing proso millet but there are problems with late germination of proso millet and with reduced control on soils receiving repeated applications of Eradicane. Bladex applied as a tank mixture with Eradicane or applied as an early postemergence treatment on land treated prior to planting with Eradicane may improve suppression of proso millet by Eradicane. These treatments will not be effective if applied to land treated with Eradicane, Sutan+ or Eptam the previous year.

Preplant Incorporated

Bladex L (480 g/L), Bladex 80 W (80%) and Dual (950 g/L) Controls several grassy and broadleaf weeds. See *Table 3.* Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with Dual at 0.81 to 1.11 L/acre. Apply in 60 L/acre water and incorporate in the top 2 inches (5 cm) of soil with a tandem disc, vibrating shank cultivator or harrows set to work the soil no deeper than 4 inches (10 cm). Immediate incorporation is not required. Use the lower rates on light soils and the higher rates on medium textured and high organic matter soils (above 5 per cent). Do not use on peat or muck soils. Do not use on soils with less than one per cent organic matter. Bladex may leave a residue in the soil. See caution note at beginning of the corn section.

Bladex L (480 g/L), Bladex 80 W (80%) and Eradicane 8-E (800 g/L) Controls several grasses and broadleaf weeds. See Table 3. Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with 1.72 to 3.44 L/acre of Eradicane 8-E in 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Refer to the *Herbicide Incorporation* section under "Eradicane" for incorporation instructions. Use the lower rate of Bladex on light textured soils. Do not use on soils with less than one per cent organic matter. Do not use on soils treated with Eradicane, Eptam or Sutan the previous year. Bladex may leave a residue in the soil. See caution note at the beginning of the corn section.

Bladex L (480 g/L), Bladex 80 W (80%) and Sutan+ (800 g/L) Controls several grasses and broadleaf weeds. See Table 3. Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with 1.72 to 2.23 L/acre of Sutan+ in 45 L/acre water to the dry soil surface of a well prepared seedbed and incorporate immediately. See the *Herbicide Incorporation* section under "Eradicane" for incorporation instructions. Use the lower rate of Bladex on light textured soils and the higher rate on medium textured soils. Do not use on soils with less than one per cent organic matter. Do not use on soils treated with Eptam, Eradicane or Sutan the previous year. Bladex may leave a residue in the soil. See the caution note at the beginning of the corn section.

Dual (960 g/L) Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre of water. Incorporate in the top 2 inches (5 cm) of soil with a tandem disc, vibrating shank cultivator or harrows, set to work the soil no deeper than 4 inches (10 cm). Immediate incorporation is not required. Do not use on peat or muck soils. Dual may be tank mixed with Aatrex or Atrazine. Incorporation instructions are given in the *Herbicide Incorporation* section. Heavy rainfall following application may result in reduced weed control, especially on sandy soils.

Eradicane 8-E (800 g/L) Controls several grasses and broadleaf weeds. (Table 3) Apply 1.72 to 3.44 L/acre in a minimum of 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Refer to *Herbicide Incorporation* section for incorporation instructions. Eradicane 8-E may be applied with liquid fertilizer or on dry fertilizer. Refer to the *Herbicide Incorporation* section for application and incorporation instructions. Use the 3.44 L/acre rate to control quack grass. Cut the underground rhizomes of quack grass thoroughly so that four or less nodes remain on the strand.

CAUTION: ***The level of weed control will be reduced where Eradicane is used on soils which have been treated with Eradicane or Eptam or Sutan+ the pre-***

vious growing season. It is anticipated that the reduction in control will be greater where Eradicane, Eptam or Sutan+ has been used repeatedly for two or more years.

Eradicane 8-E (800 g/L) plus Atrazine Controls several grasses and broadleaf weeds (Table 3). Apply 1.72 to 2.23 L/acre Eradicane and 0.93 to 1.46 L/acre of liquid atrazine formulations containing 500 g/L atrazine or 0.53 to 0.81 kg/acre of wettable powder formulations containing 90% atrazine. For product weights or volumes of other atrazine formulations see Table 13. Use the higher rates on soils containing more than four per cent organic matter. Eradicane 8-E plus atrazine may be applied with liquid fertilizer or on dry fertilizer. See the *Herbicide Incorporation* section for incorporation instructions. This combination may leave a residue in the soil. See caution note at the beginning of the corn section.

Lasso (480 g/L) Lasso was available for use in corn under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986) or consult your Ag Rep, Weed Supervisor or Monsanto representative.

Primextra (500 g/L) Controls green and yellow foxtail, barnyard grass and several broadleaf weeds. (Table 3) Apply 2.71 to 3.44 L/acre to a firm seedbed in a minimum of 60 L/acre water. Do not use on peat or muck soils, or coarse-textured soils low in organic matter. Use the higher rate for heavy weed infestations. Refer to *Herbicide Incorporation* section for incorporation instructions. Heavy rainfall following application may result in reduced weed control, especially on sandy soils. Primextra contains atrazine. Residues may affect sensitive crops in subsequent years. See the caution note at the beginning of the corn section.

Sutan+ (800 g/L) Controls green and yellow foxtail and barnyard grass. Apply 1.72 to 2.23 L/acre in a minimum of 45 L/acre water to the dry soil surface of a well prepared seedbed. For incorporation instructions, refer to "Eradicane and Sutan+" in the *Herbicide Incorporation* section. Sutan+ may be applied with liquid fertilizer or on dry granular fertilizers. To apply with dry fertilizer, spray the herbicide onto the fertilizer using a rotary drum type blender. A minimum of 80 kg/acre of fertilizer is necessary to ensure uniform distribution through the soil. Do not use nitrate fertilizers. Consult the label for a listing of recommended fertilizer types. Apply to a dry soil surface using a double overlap pattern to ensure even distribution.

Under cool soil conditions, Sutan+ should be tank mixed with atrazine or Bladex.

CAUTION: *The level of weed control will be reduced where Sutan+ is used on soils which have been treated with Eradicane, Eptam or Sutan+ the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

Sutan+ (800 g/L) and Atrazine Controls several grasses and broadleaf weeds. (Table 3) Apply 1.72 to 2.23 L/acre Sutan+ and 0.91 L/acre of liquid formulations containing 500 g/L atrazine or 0.51 kg/acre of wettable powder formulations containing 90 per cent atrazine as a tank mix in a minimum of 45 L/acre water. For product weights or volumes of other Atrazine formulations see Table 13. Apply to the dry soil surface of a well prepared seedbed. Refer to *Herbicide Incorporation* section for incorporation instructions. This combination may leave a residue in the soil. See caution note at the beginning of the corn section. Sutan+ plus atrazine may be applied with liquid fertilizer or on dry granular fertilizers.

Preemergence

The following herbicides are recommended for preemergence application under irrigated conditions only.

Aatrex Liquid, Aatrex Nine-O, Aatrex 90W, Atrazine 500, Atrazine 80W, Atrazine 90W Controls wild oats, and several broadleaf weeds. See Table 3. Apply 1.82 to 2.73 L/acre of liquid formulations containing 500 g/L or 1.01 to 1.36 kg/acre of wettable powder formulations containing 90 per cent atrazine after seeding but before crop or weed emergence. For equivalent weights or volumes of other atrazine formulations see Table 13. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within seven days following application for satisfactory results. May be tank mixed with Bladex, Dual or Lasso. Apply 1.01 L/acre of liquid atrazine formulations containing 500 g/L atrazine or 0.51 kg/acre of wettable powder formulations containing 90 per cent atrazine tank mixed with 1.92 L/acre of Bladex liquid or 1.11 kg/acre of Bladex 80W or with 0.81 to 1.11 L/acre of Dual or with 2.43 to 3.24 L/acre of Lasso. Atrazine products may leave a residue in the soil. See caution note at the beginning of the corn section.

Bladex (480 g/L), Bladex 80W (80%) Controls green and yellow foxtail, barnyard grass, and several broadleaf weeds. See Table 3. Apply 1.92 to 2.02 L/acre of Bladex liquid or 1.11 to 1.21 kg/acre of Bladex 80W in 60 to 120 L/acre water prior to crop and weed emergence. Use the higher rate on sandy loam soils. Use only on sandy and sandy loam soils. Do not use on soils containing less than one per cent organic matter or on soils containing more than 70 per cent sand. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within seven days following application for satisfactory results. Bladex leaves a residue in the soil which may affect subsequent crops. See the caution note at the beginning of the corn section. Bladex may be tank mixed with atrazine products, Dual or Lasso.

Dual (960 g/L) Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre of water after planting but prior to crop and weed emergence. Rain or irrigation of at least

0.5 inches (1.25 cm) is required within 10 days following application for satisfactory results. Do not use on peat or muck soils. Heavy rainfall or excessive irrigation following application may result in reduced weed control, especially on sandy soils. Dual may be tank mixed with atrazine products or Bladex.

Lasso (480 g/L) Lasso was available for use in corn under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986) or consult your Ag Rep, Weed Supervisor or Monsanto representative.

Primextra (500 g/L) Controls green and yellow foxtail, barnyard grass and several broadleaf weeds. See Table 3. Apply 2.71 to 3.44 L/acre in a minimum of 60 L/acre water after seeding but before crop or weed emergence. Use the higher rate for heavy weed infestations. Rain or irrigation of at least 0.5 inch (1.25 cm) is required within seven days following application for satisfactory results. This product contains atrazine and may leave a residue in the soil. See the caution note at the beginning of the corn section.

Postemergence

Aatrex Liquid, Aatrex Nine-O, Aatrex 90 W, Atrazine Flowable, Atrazine 80 W, Atrazine 90 W, and Oil (Non-Herbicidal) or Oil Concentrate Controls wild oats, seedling green and yellow foxtail, and several broadleaf weeds (Table 3). Apply 1.82 to 2.73 L/acre of liquid formulations containing 500 g/L or 1.01 to 1.36 kg/acre of wettable powder formulations containing 90 per cent atrazine with 6.88 L/acre oil in 80 to 120 L/acre water or 1.13 L/acre oil concentrate in 60 L/acre water. See Table 13 for product volumes of other Aatrex or Atrazine formulations. Apply when foxtail is in the one to two leaf stage. Foxtail control has not always been consistent. Do not add other herbicides such as 2,4-D to combinations of oil-water emulsions and Aatrex or Atrazine. These products may leave a residue in the soil. See caution note at the beginning of the corn section.

Aatrex-Plus (400 g/L), Atra-Mix (400 g/L) Controls wild oats, seedling green and yellow foxtail, and several broadleaf weeds. (Table 3) Apply 1.72 to 3.44 L/acre in 80 to 120 L/acre water when foxtail is in the one to two leaf stage. Foxtail control has not always been consistent. Do not add other herbicides such as 2,4-D. Aatrex-Plus and Atra-Mix contain oil concentrate. Additional oil or oil concentrate should not be added. These products may leave a residue in the soil. See caution note at the beginning of the corn section.

Atrazine see Aatrex.

Basagran (480 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, flower-of-an-hour 1 to 2 inches (2.5 to 5.0 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, flower-of-an-hour 2 to 4 inches (5 to 10 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. To control top growth of Canada thistle (patch treatments) apply 0.71 L/acre plus 0.71 L/acre seven to ten days later. Apply in 80 to 160 L/acre of water when thistles are 6 to 8 inches (15 to 20 cm) tall. The addition of Citowett Plus at 2.5 L/1000 L or Assist Oil Concentrate at 5 to 10 L/1000 L spray mixture will improve the control of advanced weeds. Best results are obtained when Basagran is applied under high temperature conditions (21°C, 70°F). Do not apply if rain is expected within eight hours.

Banvel (480 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.236 L/acre in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Apply up to the 12 inch (30 cm) height of corn (leaf outstretched). When corn is higher than 12 inches (30 cm) drop-nozzles must be used to direct spray to plant base.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest. Apply no later than two weeks prior to tassle emergence and before corn is over 30 inches (75 cm) tall.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Banvel (480 g/L) plus 2,4-D amine Controls several broadleaf weeds. (Table 3) Apply 0.118 L/acre Banvel plus 0.344 L/acre of formulations containing 500 g/L 2,4-D in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. For product volumes of other 2,4-D formulations see Table 14. Apply up to the 6 inch (15 cm) height of corn (leaf outstretched). When corn is higher than 6 inches (15 cm) drop-nozzles must be used to direct spray to plant base.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest. Apply no later than two weeks prior to tassle emergence and before corn is over 30 inches (75 cm) tall.

Bladex 80 W (80%) Controls several grasses and broadleaf weeds. See Table 3. Apply Bladex 80 W at 1.11 kg/acre plus Bio-Veg at 0.61 to 0.81 L/acre in 60 to 80 L/acre water. Apply when annual grasses are in the one to two leaf stage and broadleaf weeds are 0.5 to 2.0 inches (1.25 to 5.0 cm) in height. Do not apply after the three leaf stage of the corn or when corn is under stress due to prolonged cold wet growing conditions. Do not use any oils or adjuvants other than Bio-Veg with Bladex. Do not tank mix with other pesticides.

Bladex may leave a residue in the soil. See the caution note at the beginning of the corn section.

Buctril M (560 g/L) Controls several broadleaf weeds (Table 3). Apply 0.405 L/acre in 80 to 120 L/acre water at a pressure of 40 psi (275 kPa) when corn is in the four to six leaf stage and weed seedlings are small. Leaf scorch may occur if application is made under hot, humid conditions.

Laddok (400 g/L) Controls several broadleaf weeds. See Table 3. Apply 1.21 to 1.62 L/acre in 80 to 160 L/acre water at a minimum of 40 psi (275 kPa) pressure. Do not use floodjet type nozzles. Use the 1.21 L/acre rate for control of annual smartweed species (lady's thumb) 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, cocklebur 3 to 7 inches (7.5 to 17.5 cm) high and flower-of-an-hour 1 to 2 inches (2.5 to 5 cm) high. Use the 1.62 L/acre rate for control of annual smartweed species (lady's thumb) 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, flower-of-an-hour 2 to 4 inches (5 to 10 cm) high and seedlings of other susceptible weeds. Use the higher recommended water volumes for dense weed infestations. Increasing pressure to 60 psi (425 kPa) will improve penetration of the herbicide through the canopy but increases the potential for spray drift. This treatment will not control green foxtail. All applications should include Assist Oil Concentrate at 1 L/100 L of spray solution. Laddock contains atrazine. Plant only corn, flax, peas, triazine tolerant Canola or fababeans the year following Laddok application. Do not apply if rain is expected within eight hours of application.

Kil-mor (500 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.34 to 0.445 L/acre in a minimum of 45 L/acre water. Apply as an overall spray until corn is 6 inches (15 cm) tall (leaf outstretched), after which a directed spray should be used. See directed postemergence recommendations in this section. Do not apply if rain is expected within six hours.

Pardner (280 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.405 to 0.485 L/acre in at least 80 L/acre water. Apply when corn is in the four to eight leaf stage and before the weeds are past the four leaf stage. Do not apply under conditions of high humidity and high temperature (greater than 30°C, 86°F) or crop injury may occur.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Torch DS (450 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.304 to 0.354 L/acre of Torch DS in at least 60 L/acre water. Apply before weeds are past the four leaf stage and before corn is 10 inches (25 cm) tall. Do not apply under conditions of high humidity and high temperature (greater that 30°C, 86°F) or crop injury may occur.

2,4-D Amine Controls several broadleaf weeds. (Table 3) Apply 0.61 to 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water as an overall spray until corn is 6 inches (15 cm) tall (leaf outstretched), after which a directed spray should be used. See directed postemergence recommendations in this section. For product volumes of other 2,4-D amine formulations refer to Table 14.

Directed Postemergence

For corn over 6 inches (15 cm) tall (leaf outstretched). Application of these herbicides requires positioning the sprayer nozzles to direct the spray to the base of the corn plant. Severe damage is likely if the crop leaves are sprayed.

Banvel (480 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.236 L/acre in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Direct spray to base of plant after corn is more than 12 inches (30 cm) tall (leaf outstretched).

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest. Apply no later than two weeks prior to tassle emergence and before corn is over 30 inches (75 cm) tall.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Banvel (480 g/L) plus 2,4-D amine Controls several broadleaf weeds. (Table 3) Apply 0.118 L/acre Banvel plus 0.344 L/acre of formulations containing 500 g/L 2,4-D in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Direct spray to base of plant after corn is more than 6 inches (15 cm) tall (leaf outstretched). For product volumes of other 2,4-D formulations see Table 14.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest. Apply no later than two weeks prior to tassle emergence and before corn is over 30 inches (75 cm) tall.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Kil-mor (500 g/L) Controls several broadleaf weeds. (Table 3) Apply 0.445 L/acre in 45 to 80 L/acre water. Direct spray to plant base after corn is more than 6 inches (15 cm) tall (leaf outstretched).

2,4-D amine Controls several broadleaf weeds. (Table 3) Apply 0.69 L/acre of formulations containing 500 g/L 2,4-D in 45 to 80 L/acre water. Treat by directing spray to base of plant after corn is more than 6 inches (15 cm) tall (leaf outstretched). For product volumes of other 2,4-D amine formulations see Table 14.

Crambe

Preplant Incorporated

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) (Spring application only.) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart*.

Apply:

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Apply liquid formulations in 45 L/acre water. Where a rate range is specified use the heavier rate where heavy wild oat infestations are expected. Apply the granular formulations using a suitable granular applicator. Incorporate according to instructions in the *Herbicide Incorporation* section. Treflan leaves a residue in the soils which may affect subsequent crops Refer to Table 17 for susceptible crops.

Fababeans

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Rival (500 g/L), Rival 10 G(10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart*. In general, liquid formulations are best suited for spring application while granular formulations are best suited for fall application.

Spring application

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Appliction to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. Refer to Table 17 for a list of susceptible crops.

Treflan EC (545 g/L) plus Lexone DF (75%), Lexone L (480 g/L), Sencor DF (75%) or Sencor 500 F (500 g/L) Controls Treflan susceptible weeds plus several other broadleaf weeds. See *Field Crops Chart*. Apply Lexone and Sencor only as a tank mix with Treflan.

Spring application

Apply 0.61 to 1.05 L/acre Treflan with one of:

Lexone DF	0.142 - 0.223 kg/acre
Lexone L/Sencor 500	0.223 - 0.344 L/acre
Sencor DF	0.152 - 0.223 kg/acre

as a preplant application in 45 L/acre water. Incorporate as soon as possible according to instructions in *Herbicide Incorporation* section.

Fall application

Although registered for fall application, application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

Both Treflan and Sencor leave residues in the soil which may affect subsequent crops. After harvest, tillage practices that provide soil mixing may be helpful in reducing the chance of injury to subsequent crops. Refer to Table 17 for a list of susceptible crops.

Postemergence

Basagran (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water, after the fababeans are at least 4 inches (10 cm) in height. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, flower-of-an-hour 1 to 2 inches (2.5 to 5.0 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, flower-of-an-hour 2 to 4 inches (5 to 10 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. The addition of Assist Oil Concentrate at 5 to 10 L/1000 L spray mixture will improve the control of advanced weeds. For best results apply Basagran under higher temperature conditions (21°C, 70°F). Do not apply if rain is expected within eight hours.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.01 L/acre in 45 L/acre water using 80° flat fan nozzles and a nozzle pressure of 40 psi (275 kPa). Travel at a speed of 6 to 8 km/h (4 to 5 mph). Direct nozzles 45° forward. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Apply at one to four leaf stage of the weeds, before they tiller. Application of Hoe-Grass 284 during periods of stress (above 28° C (82°F), dry conditions, or when humidity is low) when plants are not actively growing may result in significantly reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. Other herbicides should be applied at least four days after Hoe-Grass application.

Sinox PE (360 g/L). Controls wild mustard, stinkweed, and volunteer rapeseed. Apply 1.11 to 1.72 L/acre in 45 to 80 L/acre water. Use when weeds are in the seedling stage and fababeans are in the two to four leaf stage. This product controls weeds by contact action only. For satisfactory weed control ensure that the field sprayer provides total coverage of all weeds.

CAUTION: *Use rubber gloves, goggles and agricultural respirator when handling Sinox PE.*

Flax

TABLE 4. SUMMARY OF FLAX RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on application rates, timing, application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, green & yellow	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Shepherd's purse	Smartweed, annual species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Asulox F	F	P	P	G	P										P				P	P[1]		
Asulox F + Buctril M	F	P	P	G	E				G	G	G[1]		G	E	E	G	G	G[1]	G	E[1]	P[2]	P[2]
Avadex BW	E			G																		
Basagran	F						F			F				F	F	F		F[1]	F	F[1]		F[3]
Basfapon/Dalapon/ Dowpon/Dowpon M	G		F																			
Basfapon/Dalapon Dowpon/Dowpon M + MCPA	F		F							G	E[1]			E	E			E[1]		E[1]		
Blagal	F				G		G				G[1]	F		E	E			G[1]	G	G[1]	P[2]	P[2]
Bromox 720 M/Buctril M/ Sabre	F				E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Eptam	F	G	G	G			G							G		G						
Hoe-Grass 284	G	G	G	G																		
Hoe-Grass 284 + Torch DS	F	G	G	G	G	P			G	F			F	G	F	F	G		G	F[1]		
Hoe-Grass II	F	G	G	G	G	P			G				F	G	F	F	G		G	F[1]		
MCPA/MCPAK	F									G	E[1]	F[4]		E	E			E[1]		E[1]	P[2]	P[2]
NaTA TCA/TCA Solution	G		F																			
NaTA TCA/TCA Solution + MCPA	F		F							G	E[1]	F[4]		E	E			E[1]		E[1]	P[2]	P[2]
Poast	E	E	E	E																		
Poast + Bromox 720 M/ Buctril M/Sabre	F	E	E	E	E	F			G	G	G[1]		G	E	E	G	G	G[1]	G	G[1]	P[2]	P[2]
Poast + MCPA amine or ester	F	G	G	G						G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
Rival/Treflan	F	G	G	F	F		G		G					G		G	G					
Stampede 360 + MCPA ester	F		G		G						G[1]		F	G	G	G		G[1]	G	G[1]		
Stampede CM	F		G		G						G[1]		F	G	G	G		G[1]	G	G[1]		
Torch DS	F				G	P			G	F			F	G	F	F	G		G	F[1]		

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Split applications required for acceptable control.

[4] MCPAK only.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats.

Apply as follows:

	ORGANIC MATTER		
	Less than 2%	**2 - 4%**	**Greater than 4%**
Fall Granular	5.7 kg/acre	6.9 kg/acre	8.9 kg/acre
Spring Granular	6.9 kg/acre	6.9 kg/acre	8.9 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.72 L/acre	1.72 L/acre	2.23 L/acre

*Although registered for fall application, the application and incorporation requirements for the liquid formulation predisposes soils to erosion and its use in the fall is not recommended.

Avadex BW liquid may be applied with liquid fertilizer, or on granular urea fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry urea fertilizers, as well as incorporation instructions for all formulations of Avadex BW. For aerial recommendations for granular Avadex BW see Table 12. Do not seed domestic oats the year after treatment with Avadex BW.

Eptam 8-E (800 g/L), Eptam 10 G (10%) Controls barnyard grass, green and yellow foxtail, wild oats and several broadleaf weeds. See *Table 4 and Field Crops Chart.*

Spring application

Apply 1.42 to 1.72 L/acre or 11.3 to 13.8 kg/acre granular product. Use the lower rate on lighter soils (sandy loams or loams) and the higher rate on heavier textured soils (clay loams, clays). Do not use on muck or peat soils with more than 15 per cent organic matter. Apply liquid in a minimum of 45 L/acre water. The granular product should be applied with a suitable granular applicator. Eptam must be applied to a dry soil surface of a well-prepared seedbed. Incorporate immediately according to instructions in *Herbicide Incorporation* section. Do not use on soils with less than three per cent organic matter. Seed shallowly, no deeper than 1.25 inches (3 cm), into a firm seedbed. Do not discer seed.

Fall application

Although registered, incorporation requirements for fall application of Eptam 8-E and Eptam 10 G will predispose fields to wind or water erosion and this use is not recommended.

Eptam 8-E may be applied with liquid fertilizer, or on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) (Fall application only.) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart.*

Fall applications (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended. Apply granular products as follows:

	SOIL TYPE	
Product	**Light soils with Less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*The two fall incorporations required may leave these soils vulnerable to wind and water erosion.

Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section. In the spring, cultivate shallowly and seed the crop into a moist, packed seedbed no more than 1.5 inches (4 cm) deep using a hoe drill or press drill. Do not seed when soil condition is cold (generally, seeding should commence no earlier than May 15). Injury to flax may occur if soil conditions are not conducive to rapid flax emergence.

Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Postemergence

Asulox F (400 g/L) Controls wild oats, suppresses green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 1.11 L/acre in 25 to 45 L/acre water when wild oats are in the two to four leaf stage and flax plants are 1 to 6 inches (2.5 to 15 cm) high.

Time the application for best control of wild oats. The addition of Buctril M as a tank mix at the rate of 0.304 L/acre improves the control of broadleaf weeds and also controls lamb's-quarters and shepherd's purse. Crop recovery may be slow if weeds have been allowed to smother the flax prior to spraying. Do not apply if rain is expected within eight hours.

CAUTION: *Do not apply during hot humid weather or when flax is under stress as severe crop injury may result.*

Bar-fox see TCA.

Basagran (480 g/L) Controls several broadleaf weeds. See *Table 4 Field Crops Chart.* Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Apply to flax when the crop is at least 2 inches (5 cms) tall. Use the lower rate to control lady's thunb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. The addition of Assist Oil Concentrate at 5 to 10 L/

1000 L spray mixture will improve the control of advanced weeds. Best results are obtained if Basagran is applied under higher temperature conditions (21°C, 70°F). Do not apply if rain is expected within eight hours.

Basfapon (74%), Dalapon (74%), Dowpon (74%) Dowpon M (74%) Controls green and yellow foxtail. Apply 0.445 to 0.708 kg/acre product in a minimum of 45 L/acre water when grasses are in the one to three leaf stage and the flax is 4 to 6 inches (10 to 15 cm) tall. Avoid overlapping. MCPA amine can be tank mixed when broadleaved weeds are present.

Blagal (375 g/L) Controls several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 0.91 L/acre in 45 L/acre water at a minimum of 40 psi (275 kPa) pressure. Use only 50 mesh metal filters and nozzle screens. If the spray mixture is allowed to stand for a length of time, vigorous agitation is required to resuspend the material. Blagal should be applied to actively growing weeds in the two to five leaf stage when the crop is 2 to 4 inches (5 to 10 cm) tall. Do not spray flax during hot, humid weather conditions. If the crop is under stress (lack of moisture or extremes in temperature) a temporary yellowing of the crop may occur.

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds. See *Table 4 and Field Crops Chart.*

Apply:

Bromox 720 M	0.316 L/acre
Buctril M	0.405 L/acre
Sabre	0.316 L/acre

Use 45 L/acre of water when flax is 2 to 4 inches (5 to 10 cm) tall and weeds are in the two to four leaf stage. There may be some leaf burn and a delay in maturity. Do not spray in hot, humid weather conditions. These treatments will give some top growth control of Canada thistle and perennial sow-thistle but rapid regrowth can be expected.

Buctril M see Bromox 720 M.

Dalapon see Basfapon.

Dowpon, Dowpon M see Basfapon.

Fusilade (250 g/L) Fusilade was available for use in flax under a temporary registration granted by Agriculture Canada in 1985. At the time of printing this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water. Apply at one to four leaf stage of the weeds, before they tiller. Use 80° degree flat fan nozzles at 40 psi (275 kPa) pressure and travel at a speed of 6 to 8 km/h (4 to 5 mph). When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), under dry conditions, or when humidity is low) when plants are not actively growing will cause a reduction in weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour.

Hoe-Grass 284 at a rate of 1.13 L/acre may be tank mixed with 0.253 L/acre of Torch DS.Wild mustard beyond the three leaf stage will not be controlled. If a wide range of leaf stages is present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard. Other herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. For aerial recommendations see Table 12.

Hoe-Grass at 1.01 L/acre may be tank mixed with Decis insecticide.

Hoe-Grass II (310 g/L) Controls wild oats, green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 1.42 L/acre in not less than 45 L/acre water with nozzles directed 45° forward, and at a minimum nozzle pressure of 40 psi (275 kPa). Use of 80° flat fan nozzles is recommended. Apply when wild oats, green and yellow foxtail, and barnyard grass are in the one to four leaf stage and before tillering, when volunteer corn is 6 to 10 inches (15 to 25 cm) in height, when Russian thistle is up to 2 inches (5 cm) in height, and when other broadleaf weeds are up to the four leaf stage. Wild mustard beyond the three leaf stage will not be controlled. If a wide range of leaf stages is present at the time of spraying a split application involving Hoe-Grass 284 and another broadleaf herbicide is recommended to obtain adequate control of wild mustard. Apply when flax is 2 to 4 inches (5 to 10 cm) in height. Do not apply to flax under stress due to hot (28°C, 82°F) or humid weather. Do not tank mix with any other pesticide, fertilizer or additive. Do not use floodjet type nozzles or controlled droplet applicators. Do not apply if rainfall is expected within one hour after application.

MCPA amine, sodium potassium salt mixtures or sodium salt. Controls several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water after flax is 2 inches (5 cm) tall but before the bud stage. For product volumes of other MCPA formulations refer to Table 14. Some delay in maturity and crop injury may result from use of the higher rates, but will usually be more than offset by increased yields, if the infestation of susceptible weeds is moderate to high. Should only wild mustard, lamb's-quarter, and spring seedlings of stinkweed or flixweed be present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. For aerial recommendations see Table 12.

MCPAK (400 g/L) Controls hemp nettle and other MCPA susceptible weeds. See *Table 4 and Field Crops Chart.* Apply 0.85 L/acre in 45 L/acre water when weeds are in the one to four leaf stage. Hemp nettle must be treated before the full four leaf stage. Apply after flax is 2 inches (5 cm) tall but before the bud stage. Some delay in maturity and crop injury may result.

NaTA TCA see TCA.

Poast (184 g/L) Controls several grassy weeds. See *Table 4 and Field Crops Chart.*

Apply:

Weed	Rate (L/acre)
green or yellow foxtail, barnyard grass, proso millet, witchgrass, volunteer corn	0.324 - 0.405
wild oats	0.57 - 0.65
volunteer wheat and oats	0.65
volunteer barley	0.77

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply in 25 to 45 L/acre of water with Assist Oil Concentrate at 0.202 to 0.405 L/acre. Apply with 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation is heavy or if crop canopy is dense, use 45 to 60 L/acre of water with 0.81 L/acre of Assist and 45 psi (300 kPa) nozzle pressures. Apply when grassy weeds are in the one to six leaf stage, with the majority in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C (60°F), or less). Do not use flood jet or hollow cone nozzles. See Table 12 for aerial recommendations.

Poast may be tank mixed with Bromox 720 M, Buctril M, Sabre, MCPA ester or MCPA amine. Refer to recommendations for the broadleaf herbicide for instructions regarding rates, stages, precautions and restrictions.

These tank mixes may cause crop injury and delayed maturity. To reduce the risk of crop injury, avoid spraying these mixtures during hot or humid weather. Do not spray these tank mixes onto flax which is unthrifty or stressed due to adverse weather conditions. Evening spraying is recommended.

If weeds are not actively growing at the time of application, the addition of the broadleaf herbicide may result in reduced grass control. Reductions will be greater with amine formulations than with ester formulations of MCPA and will be most evident with lower rates of Poast. Tank mixes with Bromox 720 M, Buctril M or Sabre must be applied before broadleaf weeds are past the four leaf stage for satisfactory control. If broad leaved weeds and grasses are not both in the recommended treatment stage at the same time, separate applications should be made.

Sabre see Bromox 720 M.

Stampede 360 (360 g/L) plus MCPA ester Controls green and yellow foxtail and several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 1.11 L/acre Stampede 360 in a tank mix with 0.223 L/acre of MCPA ester (500 g/L) in 45 L/acre water when weeds are in the one to four leaf stage and the majority of the foxtail is in the three leaf stage and less than one inch (2.5 cm) tall. Flax at application time must be at least 2 inches (5 cm) but not more than 5 inches (12 cm) in height. Do not spray when temperature exceeds 30°C (86°F). For product volumes of other MCPA ester formulations see Table 14. Spray using flat fan nozzles and a pressure of 40 psi (275 kPa). "Floater" type equipment may be used provided 60 L/acre spray volume is used. Allow 14 days between application of Stampede 360 and Dimethoate (Cygon) or Malathion insecticides. Do not apply other insecticides the same season as Stampede application. Allow three days between application of Stampede 360 and application of other herbicides. Do not apply if rain is expected within one hour. Do not allow the spray solution to stand in the tank overnight. Do not apply to flax if the field has been treated with atrazine during the previous 26 months.

CAUTION: *Under stress conditions, expect some suppression of flax growth immediately after treatment and some delay in maturity.*

Stampede 360 is also registered for application without MCPA. The spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Stampede CM (460 g/L) Controls green and yellow foxtail and several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 1.11 L/acre in 45 L/acre water when weeds are in one to four leaf stage and the majority of the foxtail is in the three leaf stage and less than 1 inch (2.5 cm) tall. Flax at application time must be at least 2 inches (5 cm) but not more than 5 inches (12 cm) in height. Spray using flat fan nozzles and a pressure of 40 psi (275 kPa). "Floater" type equipment may be used provided 60 L/acre water volume is used. Do not spray when temperatures exceed 30°C (86°F). Allow 14 days between application of Stampede CM and Dimethoate (Cygon) or Malathion insecticides. Do not apply other insecticides the same season as Stampede application. Allow three days between application of Stampede CM and application of other herbicides. Do not apply if rain is expected within one hour. Do not allow the spray solution to stand in the tank overnight. Do not apply to flax if the field has received an application of atrazine during the previous 26 months.

CAUTION: *Under stress conditions, suppression of flax growth immediately after treatment and some delay in maturity can be expected.*

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 1.81 kg/acre product of Bar-fox or NaTA TCA, or 2.23 to 3.64 L/acre TCA Solution in 45 to 60 L/acre water. Apply before the foxtail reaches the three leaf stage, when the flax is 4 to 6 inches (10 to 15 cm) high. Avoid overlapping. NaTA TCA can be tank mixed with MCPA amine. TCA solution can be tank mixed with MCPA ester. Bar-fox can be tank mixed with Estemine MCPA.

Torch DS (450 g/L) Controls several broadleaf weeds. See *Table 4 and Field Crops Chart.* Apply 0.253 L/acre in 45 L/acre water when flax is 2 to 4 inches (5 to 10 cm) tall, when Russian thistle is up to 2 inches (5 cm) in height, and when other broadleaf weeds are up to the four leaf stage. Wild mustard beyond the three leaf stage will not be controlled. If a wide range of leaf stages are present at the time of spraying, tank mixing with MCPA is recommended to obtain adequate control of wild mustard.

Do not spray flax during hot humid weather conditions. Torch DS may be tank mixed with MCPA amine at 0.227 L/acre (500 g/L) or with MCPAK at 0.283 L/acre to improve control of more advanced weeds. For product volumes of other MCPA amine formulations, refer to Table 14.

For flax underseeded to forages see the *Forage Crops* section.

Lentils

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) (Fall applications only.) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart.*

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

Product	SOIL TYPE	
	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*The two fall incorporations required may leave these soils vulnerable to wind and water erosion.

Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

In the spring till shallowly, seed the crop no more than 1.5 inches (4 cm) deep into a moist, packed seedbed using a hoe drill or press drill. Do not seed when soil condition is cold (generally, seeding should commence no earlier than May 15). Crop injury may occur if soil conditions are not conducive to rapid emergence of the lentils.

Postemergence

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water. Apply at one to four leaf stage and before tillering of the weeds. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will result in reduced weed control. Other herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

Lexone DF (75%), Lexone L (480 g/L), Sencor 500 L (500 g/L), Sencor DF (75%) Suppression of several broadleaf weeds. See *Field Crops Chart.*

Apply:

Lexone DF	0.113 kg/acre
Lexone L	0.178 L/acre
Sencor DF	0.111 kg/acre
Sencor 500	0.172 L/acre

Apply in 70 L/acre water to seedling weeds less than 2 inches (5 cm) in height or diameter when lentil vines are 3 to 6 inches (7.5 to 15 cm) long. Directing the nozzles 45° forward may improve spray coverage. Do not apply within 3 days after periods of cool, wet, or cloudy weather as crop injury may occur. Do not apply more than once per crop season. Crop must be planted at least 2 inches (5 cm) below the soil surface. Do not use on soils containing less than four per cent organic matter. Do not treat within 70 days of harvest. Avoid grazing or feeding treated crop to livestock within 70 days of application. Do not apply if rain is expected within six hours. Temporary (one to ten days) lightening in crop color and a slight reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within one or two days after application. Do not apply for four to five days after frost and allow a four to five day interval between application of Sencor or Lexone and other pesticides. Lentils provide little competition against weed growth. Under conditions of heavy weed pressure or lush weed growth, this treatment may not provide adequate control due to regrowth of some weeds.

Mustard

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats. The liquid formulation is best suited for spring applications, while the granular formulation is best suited for use in fall. Apply rate recommended in fall or before seeding in the spring.

	SOIL ORGANIC MATTER		
	Less than 2%	2 – 4%	More than 4%
Fall Granular	5.7 kg/acre	6.9 kg/acre	8.9 kg/acre
Spring Granular	6.9 kg/acre	6.9 kg/acre	8.9 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.72 L/acre	1.72 L/acre	2.23 L/acre

*Application and incorporation requirements for fall application of the liquid formulation predisposes soils to erosion and this use is not recommended.

For fall application, apply granules between September 15 and freeze-up. Apply granular formulations using a suitable granular applicator. Refer to the *Herbicide Incorporation* section for incorporation instructions.

Avadex BW liquid may be applied in 45 L/acre water, with liquid fertilizer, or on granular urea fertilizer. See the *Herbicide Incorporation* section for instructions on use with dry urea fertilizer and for specific incorporation instructions. For aerial recommendations for granular Avadex BW see Table 12. Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Field Crops Chart.*

Spring application

Product	SOIL TYPE	
	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although liquid formulations are registered for fall application, the application and incorporation requirements for fall application predispose soils to erosion and this use is not recommended.

Product	SOIL TYPE	
	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Postemergence

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply at 1.01 L/acre in at least 45 L/acre water. Apply at the one to four leaf stage of the weeds, before they tiller. Use 80° flat fan nozzles at 40 psi (275 kPa) pressure and travel at a speed of 6 to 8 km/h (4 to 5 mph). When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28° C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will result in reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. Hoe-Grass 284 may be tank mixed with Decis insecticide.

Peas

(Field and Processing)

TABLE 5. SUMMARY OF PEA RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, green and yellow	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Shepherd's purse	Smartweed, annual species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Avadex BW	E			G																		
Basagran	F						F			F				F	F	F	F	F[1]	F	F[1]		P[2]
Basfapon/Dalapon/Dowpon	G		G																			
Basfapon/Dalapon + MCPA Sodium Salt	F		G							G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
Hoe-Grass 284	G	G	G	G																		
Lexone/Sencor	F					F	F					F		F	F	F	F		F	F		
MCPA Sodium Salt	F									G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
Rival/Treflan/Triflurex	G	G	G	F	F		G		G					G		G	G					
TCA (Bar-Fox/NaTa TCA/ TCA Solution)	G		F																			
TCA + MCPA Sodium Salt	F		F							G	E[1]			E	E			E[1]		E[1]	P[2]	P[2]
Tropotox Plus	F										G[1]			G	G	G		G[1]		G[1]	P[2]	P[2]

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L) Controls wild oats. Apply 1.72 L/acre in 45 L/acre water before seeding. For spring application on field peas only. Avadex BW liquid may be applied with liquid fertilizer or on granular urea fertilizer. Refer to *Herbicide Incorporation* section for instructions on use with dry urea fertilizer and for specific incorporation instructions. Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Table 5 and Field Crops Chart.*

Spring application

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although liquid formulations are registered for fall application, the application and incorporation requirements for fall application predispose soils to erosion and this use is not recommended.

Product	SOIL TYPE	
	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Postemergence

Bar-fox see TCA.

Basagran (480 g/L) Controls several broadleaf weeds. See *Table 5 and Field Crops Chart.* Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water after peas have three pairs of leaves. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 5 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. The addition of Citowett Plus at 2.5 L per 1000 L spray mixture will improve the control of advanced weeds. Basagran gives best results when applied under higher temperature conditions (21°C, 70°F). Avoid spraying process peas with a ground sprayer after the vines are more than 6 inches (15 cm) in length to minimize mechanical damage to the vines. Do not apply if rain is expected within eight hours.

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%). Controls green and yellow foxtail. Apply 0.445 kg/acre product in a minimum of 110 L/acre water when peas are 2 to 6 inches (5 to 15 cm) high. Apply at least 25 days prior to harvest. Do not feed pea vines, pea silage or pea vine hay to livestock.

Basfapon may be tank mixed with MCPA, Tropotox Plus, or Sinox PE.

Dalapon may be tank mixed with Sinox PE.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water with nozzles directed forward 45°. Apply at one to four leaf stage of the weeds, before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions or when humidity is low) when plants are not actively growing will cause a reduction in weed control. Other herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

Lexone DF (75%), Sencor 500 F (500 g/L), Sencor 75 DF (75%) Controls several broadleaf weeds. See *Table 5 and Field Crops Chart.*

Apply:

Lexone DF	0.113 to 0.162 kg/acre
Sencor DF	0.111 to 0.152 kg/acre
Sencor 500	0.172 to 0.223 L/acre

Apply in 70 L/acre water to seedling weeds less than 2 inches (5 cm) in height or diameter. Apply before pea vines are 6 inches (15 cm) long. Directing nozzles 45° forward may improve spray coverage. Do not apply within three days after periods of cool, wet, or cloudy weather as crop injury may occur. Do not apply for five days after a frost. Temporary lightening in crop colour and a slight reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within one or two days after application. Do not apply if rain is expected within six hours. Do not tank mix with other pesticides, wetting agents, or surfactants. Allow a five day interval between application of Sencor and other pesticides. Apply Sencor only once per season. Use only if crop is planted at least 2 inches (5 cm) below the soil surface. Do not use on soils with less than three per cent organic matter. Under conditions of heavy weed pressure or lush growth, this treatment may not provide adequate control due to regrowth of some weeds.

MCPA Sodium Salt (300 g/L) Controls several broadleaf weeds. See *Table 5 and Field Crops Chart.* Apply 0.61 L/acre in 60 to 80 L/acre water when vines are 4 to 7 inches (10 to 18 cm) long. MCPA sodium salt may be mixed with Dalapon or TCA.

NaTA TCA (85%) see TCA.

Sinox PE (360 g/L) Controls several broadleaf weeds. See *Table 5 and Field Crops Chart.* Apply 1.21 to 1.62 L/acre in a minimum of 45 L/acre water when pea vines are 4 to 8 inches (10 to 20 cm) long and weeds are small. Sinox PE may be tank mixed with Dalapon.

Sinox PE controls weeds by contact action only. It is important to ensure that the field sprayer provides total coverage of all weeds to obtain satisfactory control.

CAUTION: ***Use rubber gloves, goggles and agricultural respirator when handling Sinox PE.***

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 1.82 kg/acre product of NaTA TCA or Bar-fox, or 2.22 to 3.64 L/acre of TCA Solution in 45 L/acre water, to field peas only. Use when pea vines are 4 to 8 inches (10 to 20 cm) long and when the foxtail is in the one to three leaf stage. Bar-fox, NaTA TCA and TCA Solution may be tank mixed with MCPA sodium salt.

Tropotox Plus (400 g/L) Controls several broadleaf weeds. See *Table 5 and Field Crops Chart.* Apply 1.11 to 1.72 L/acre in 60 to 80 L/acre water, when peas have three to six nodes. This treatment is especially useful in peas for the prevention of Canada thistle head formation.

CAUTION: *For sensitive canning peas, use Tropotox only.*

Rapeseed (including Canola)

TABLE 6. SUMMARY OF RAPESEED RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, green and yellow	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow Cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Shepherd's purse	Smartweed, annual[1] species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Avadex BW	E			G																		
Basfapon/Dalapon/Dowpon	E		G																			
Benazolin	G														P							
Hoe-Grass 284	G	G	G	G																		
Hoe-Grass 284 + Lontrel	G	G	G	G	F																G[1]	G
Lontrel	G				F																G[1]	E
Poast	E	E	E	E																		
Rival/Treflan/Triflurex	E	G	G	F	F		G		G					G		G	G					
TCA (Bar-fox/NaTA TCA/TCA Solution)	G		F																			

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Top growth only, regrowth can be expected.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats. The liquid formulation is best suited for spring applications, while the granular formulation is best suited for use in fall. Apply rate recommended in fall or before seeding in the spring.

	SOIL ORGANIC MATTER		
	Less than 2%	**2 - 4%**	**More than 4%**
Fall Granular	5.7 kg/acre	6.9 kg/acre	8.9 kg/acre
Spring Granular	6.9 kg/acre	6.9 kg/acre	8.9 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.72 L/acre	1.72 L/acre	2.23 L/acre

*Application and incorporation requirements for fall application of the liquid formulation predisposes soils to erosion and this use is not recommended.

For fall application, apply granules between September 15 and freeze-up. Apply granular formulations using a suitable granular applicator. Refer to the *Herbicide Incorporation* section for incorporation instructions.

Avadex BW liquid may be applied with liquid fertilizer, or on granular urea fertilizer. See the *Herbicide Incorporation* section for instructions on use with dry urea fertilizer and for specific incorporation instructions. For aerial recommendations for granular Avadex BW see Table 12. Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500 g/L), Rival 10 G(10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Table 6 and Field Crops Chart.* In general, liquid formulations are best suited for spring application while granular formulations are best suited for fall application.

Spring application

	SOIL TYPE	
Product	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall application (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

	SOIL TYPE	
Product	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section.

Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Postemergence

Rapeseed (Canola) is extremely sensitive to broadleaf herbicides such as 2,4-D, MCPA and Banvel. Ensure that sprayers are thoroughly cleaned before using to apply herbicides to rapeseed (Canola). The Manitoba Agriculture publication *Field Sprayers* contains detailed instructions on cleaning sprayers.

Bar-fox see TCA.

Basfapon (74%), Dalapon (74%), Dowpon M (74%) Controls green and yellow foxtail. Apply 0.445 to 0.71 kg/acre product in a minimum of 45 L/acre water when grasses are in the one to three leaf stage. Basfapon should be applied when rapeseed is in the two to four leaf stage; Dowpon and Dowpon M should be applied when rapeseed is from seedling to 6 inches (15 cm) tall.

Benazolin (330 g/L) Suppression of wild mustard. Apply 0.85 L/acre in 25 to 45 L/acre water when rapeseed is in the three to five leaf stage and wild mustard in the two to four leaf stage. Do not apply if rain is expected within four hours.

Carbyne 2 EC (240 g/L) Carbyne is registered for wild oat control in rapeseed. Carbyne must be applied when wild oats are in the one to two leaf stage. Vigorous crop competition is necessary to suppress the remaining wild oats. To improve control with Carbyne apply only at the higher registered rates of 0.61 to 0.71 L/acre. Refer to the product label for detailed application instructions.

Dalapon see Basfapon.

Dowpon M see Basfapon.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water with nozzles directed 45° forward when weeds are in the one to four leaf stage, before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing may result in reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. For aerial recommendations see Table 12.

Hoe-Grass 284 at 1.13 L/acre may be tank mixed with Lontrel. Use only the 0.405 L/acre rate of Lontrel when mixing with Hoe-Grass 284. Apply when wild oats or green foxtail are in the 1 to 4 leaf stage, when Canada thistle is at least 4 inches (10 cms) tall, and when the crop is in the three to six leaf stage. If grassy and broadleaf weeds are not all in the correct stage for application, a split application of the two herbicides is recommended. Hoe-Grass may also be tank mixed with Decis insecticide.

Lontrel (200 g/L) Controls Canada thistle, wild buckwheat, scentless chamomile and perennial sow thistle (top growth only). Use 0.405 to 0.61 L/acre Lontrel in 45 to 60 L/acre water. Spray at 30 to 40 psi (200 to 275 kPa). Apply when the rapeseed is in the three to six leaf stage and when Canada thistle is between 4 inches (10 cm) tall and early bud stage and is actively growing. Use of the lower rate will provide top growth control of Canada thistle during the year of treatment. The higher rate will affect the Canada thistle root system and will extend control into the next growing season.

Lontrel at 0.405 L/acre may be tank mixed with Hoe-Grass 284 at 1.13 L/acre

CAUTION: *Fields treated with Lontrel should be seeded to wheat, oats, barley, rye, flax, canola or may be summerfallowed the year after treatment. Residual carryover two years after application has not been fully evaluated. Sensitive crops such as sunflowers, pulse crops or small seeded legumes could be affected two or more years after application of Lontrel.*

NaTA TCA (85%) see TCA.

Poast (184 g/L) Controls several grassy weeds. See *Table 6 and Field Crops Chart.*

Weed	**Rate (L/acre)**
green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn	0.324 - 0.405
wild oats	0.57 - 0.65
volunteer wheat and oats	0.65
volunteer barley	0.77

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply Poast in 20 to 45 L/acre of water with Assist Oil Concentrate at 0.202 to 0.405 L/acre. Apply with stainless steel 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation or crop canopy is dense, use 45 to 60 L/acre of water with 0.81 L/acre of Assist and 45 psi (300 kPa) nozzle pressures. Apply when grassy weeds are in the one to six leaf stage, with the majority of in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C (60°F), or less). Do not use flood jet or hollow cone nozzles. Do not harvest within 70 days of treatment. For aerial recommendations see Table 12.

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 1.81 kg/acre product of Bar-fox or NaTA TCA, or 2.22 to 3.64 L/acre TCA Solution in 45 to 60 L/acre water when the rapeseed is in the two to four leaf stage and before the foxtail reaches the three leaf stage. Avoid overlapping. Do not tank mix with other herbicides in rapeseed.

Triazine Tolerant Canola

TABLE 7. SUMMARY OF TRIAZINE TOLERANT CANOLA RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, green and yellow	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Shepherd's purse	Smartweed, annual species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Avadex BW	E			G																		
Basfapon/Dalapon/Dowpon	E		G																			
Bladex	G				G		G	G				F		G	G	F		G	G	G		
Hoe-Grass 284	G	G	G	G																		
Hoe-Grass 284 + Lontrel	G				F																G[1]	G
Lontrel	G				F																G[1]	E
Poast	E	E	E	E																		
Poast + Bladex	G	E	E	E	G		G	G				F		G	G	F		G	G	G		
Rival/Treflan/Triflurex	E	G	G	F	F		G		G					G		G	G					
Sencor (postemergence)	G					F	G					F		G	G	F		G	G	G		
Sencor + Treflan	G	G	G	F	F	G	G		G					G	G	G	G	G		G		
TCA (Bar-fox/NaTA TCA/TCA Solution)	G		G																			

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Top growth only, regrowth can be expected.

Triazine tolerant canola will not be affected by herbicide carryover from applications of atrazine or Bladex in previous years. Mustard species can be controlled selectively in triazine tolerant canola through use of Bladex or Sencor. Use these products only on the triazine tolerant variety OAC Triton. Other rapeseed and canola varieties will be killed by Bladex or Sencor treatments.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%)
Controls wild oats. The liquid formulation is best suited for spring applications, while the granular formulation is best suited for use in fall. Apply rate recommended in fall or before seeding in the spring.

	SOIL ORGANIC MATTER		
	Less than 2%	2 - 4%	More than 4%
Fall Granular	5.7 kg/acre	6.9 kg/acre	8.9 kg/acre
Spring Granular	6.9 kg/acre	6.9 kg/acre	8.9 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.72 L/acre	1.72 L/acre	2.23 L/acre

*The application and incorporation requirements for fall application of the liquid formulation predispose soils to erosion and this use is not recommended.

For fall applications, apply granules between September 15 and freeze-up. Apply the liquid formulation in 45 L/acre water. Apply the granular formulation using a suitable granular applicator. Refer to the *Herbicide Incorporation* section for incorporation instructions.

Avadex BW liquid may be applied with liquid fertilizer, or on granular urea fertilizer. Refer to the *Herbicide Incorporation* section for detailed instructions. For aerial recommendation of granular Avadex BW see Table 12. Do not seed domestic oats the year after treatment with Avadex BW.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Table 7 and Field Crops Chart.*

Spring application

	SOIL TYPE	
Product	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

	SOIL TYPE	
Product	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section. Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Treflan EC (545 g/L) plus Sencor 500 F (500 g/L) Controls several grassy and broadleaf weeds including wild mustard and stinkweed. See Table 7 and the *Field Crops Chart.*

Spring application

Soil Organic Matter	Treflan Rate	Sencor Rate
2 - 6%	0.61 L/acre	0.172 - 0.223 L/acre
6 - 10%	0.81 - 1.05 L/acre	0.223 - 0.344 L/acre

Treflan and Sencor rates vary according to soil organic matter level. Refer to product labels for additional information. Do not apply to soils with more than 10 per cent organic matter. Use the 1.05 L/acre rate of Treflan when heavy wild oat infestations are anticipated.

To tank mix Treflan and Sencor, fill the tank 1/4 to 1/3 full with water, then add Sencor 500 F. Continue filling with water while adding Treflan EC. Maintain constant agitation while filling and applying. Use 50 mesh metal filters and nozzle screens. Apply in 45 L/acre water and incorporate according to instructions for Rival/Treflan/Triflurex in *Herbicide Incorporation* section.

Fall application

Although registered for fall application, application and incorporation requirements for fall application of the Treflan plus Sencor tank mix predispose soils to erosion and this use is not recommended.

CAUTION: *Do not plant rapeseed varieties other than OAC Triton into fields treated with the Treflan/Sencor tank mix as severe crop injury will result.*

Postemergence

Triazine-tolerant canola is extremely sensitive to broadleaf herbicides such as 2,4-D, MCPA and Banvel. Ensure that sprayers are thoroughly cleaned before using to apply herbicides to triazine tolerant canola. The Manitoba Agriculture publication *Field Sprayers* contains detailed instructions on cleaning sprayers.

Bar-fox see TCA.

Basfapon (74%), Dalapon (74%), Dowpon M (74%) Controls green and yellow foxtail. Apply 0.445 to 0.71 kg/acre product in a minimum of 45 L/acre water when grasses are in the one to three leaf stage. Basfapon should be applied when rapeseed is in the two to four leaf stage; Dowpon and Dowpon M should be applied when rapeseed is from seedling to 6 inches (15 cm) tall.

Bladex L (480 g/L), Bladex TTC (480 g/L) Controls several broadleaf weeds including wild mustard, stinkweed and shepherd's purse. See *Table 7 and Field Crops Chart.* Apply 1.21 L/acre in 45 L/acre water when the weeds are in the one to four leaf stage. Use 50 mesh screens. Spray at 40 psi (275 kPa) pressure.

Bladex L can be tank mixed with Poast for use in triazine tolerant Canola. See the Poast recommendation for information regarding rates, precautions and restrictions. To mix with Poast, add the Bladex when the tank is partially full. Continue filling, then add the Poast and Assist. Maintain agitation throughout the filling procedure.

CAUTION: *Apply to OAC Triton only. Application to other canola varieties will result in severe crop injury.*

Dalapon see Basfapon.

Dowpon M see Basfapon.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water with nozzles directed 45° forward. Apply when grassy weeds are in the one to four leaf stage and before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), under dry conditions, or when humidity is low) when plants are not actively growing may result in reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. For aerial recommendations see Table 12.

Hoe-Grass 284 at 1.13 L/acre may be tank mixed with Lontrel. Use only the 0.405 L/acre rate of Lontrel when mixing with Hoe-Grass 284. Apply when wild oats or green foxtail are in the one to four leaf stage, when Canada thistle is at least 4 inches (10 cms) tall, and when the crop is in the three to six leaf stage. If grassy and broadleaved weeds are not all in the correct stage for application, a split application of the two herbicides is recommended.

Hoe-Grass may also be tank mixed with Decis insecticide.

Lontrel (200 g/L) Controls Canada thistle, wild buckwheat, scentless chamomile and perennial sow thistle (top growth only). Use 0.405 to 0.61 L/acre Lontrel in 45 to 60 L/acre water. Spray at 30 to 40 psi (200 to 275 kPa). Apply when the rapeseed is in the three to six leaf stage and when Canada thistle is between 4 inches (10 cm) tall and early bud stage and actively growing. Use of the lower rate will provide top growth control of Canada thistle during the year of treatment. The higher rate will affect the Canada thistle root system and will extend control into the next growing season.

Lontrel at 0.405 L/acre may be tank mixed with Hoe-Grass 284 at 1.13 L/acre

CAUTION: *Fields treated with Lontrel should be seeded to wheat, oats, barley, rye, flax, canola or may be summerfallowed the year after treatment. Residual carryover two years after application has not been fully evaluated. Sensitive crops such as sunflowers, pulse crops or small seeded legumes could be affected two or more years after application of Lontrel.*

NaTA TCA see TCA.

Poast (184 g/L) Controls several grassy weeds. See *Table 7 and Field Crops Chart.*

Apply:

Weed	Rate (L/acre)
green and yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn	0.324 - 0.405
wild oats	0.57 - 0.65
volunteer wheat and oats	0.65
volunteer barley	0.77

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply in 25 to 45 L/acre water at a minimum pressure of 35 psi (240 kPa). Include Assist Oil Concentrate at 0.202 to 0.405 L/acre. Use the higher rate of Assist when applying the higher recommended spray volumes. If weed infestation is dense or if crop canopy is heavy, use 45 to 60 L/acre water with 0.81 L/acre of Assist and 45 psi (300 kPa) nozzle pressures. Apply when grassy weeds are in the one to six leaf stage with the majority in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding, or prolonged cool temperatures (15°C (59°F), or less). Do not apply using floodjet or hollow cone nozzles. Poast may be tank mixed with Bladex L. See Bladex recommendation for mixing instructions. For aerial recommendations see Table 12. Do not harvest within 70 days of treatment.

Sencor 500 F (500 g/L), Sencor 75 DF (75 %) Controls several broadleaf weeds including wild mustard. See *Table 7 and Field Crops Chart.*

Apply:

Sencor DF	0.111 kg/acre
Sencor 500	0.172 L/acre

Apply in 70 L/acre water when the weeds are less than 2 inches (5 cm) tall and at least 75 days before harvest of the crop. Use 50 mesh metal filters and nozzle screens. Agitate solution continuously to prevent settling in the tank. Do not tank mix with any other herbicides for postemergence applications of Sencor. Allow five days after Sencor application before applying other chemicals. Do not apply within three days of cloudy or cool weather or crop injury will result. If frost occurs, allow four to five days before treatment. Do not apply if rainfall is expected within six hours.

CAUTION: *Apply Sencor to OAC Triton canola only. Application to other canola varieties will result in severe crop injury.*

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 1.81 kg/acre product of Bar-fox or NaTA TCA, or 2.23 to 3.64 L/acre TCA Solution in 45 to 60 L/acre water when rapeseed is in the two to four leaf stage and before foxtail reaches the three leaf stage. Avoid overlapping. Do not tank mix with any other herbicides.

Safflower

There are no herbicides currently registered in Canada for use in safflower.

Soybeans

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Amiben (240 g/L) plus Treflan EC (545 g/L) Controls wild oats, green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Field Crops Chart.* Apply Amiben at 3.74 L/acre only as a tank mix with Treflan at 0.61 to 0.81 L/acre in at least 45 L/acre water. Apply to a dry soil surface in the spring before planting, and incorporate as soon as possible according to instructions for Rival/Treflan/Triflurex in the *Herbicide Incorporation* section.

Treflan EC (545 g/L), Treflan QR 5 (5%) Controls wild oats, green and yellow foxtail and several broadleaf weeds. See *Field Crops Chart.*

	SOIL TYPE	
	Light soils less than 6% organic matter	Medium to heavy soils 6–15% organic matter
Spring Treflan EC	0.61 L/acre*	0.81 - 1.05 L/acre
Fall Treflan QR 5	8.9 kg/acre	11.3 - 13.8 kg/acre
Spring Treflan QR 5	6.9 kg/acre*	8.9 - 10.9 kg/acre

*Application to light textured soils may predispose fields to wind or water erosion.

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

Apply liquid formulations in 45 L/acre water. Incorporate according to the directions given in the *Herbicide Incorporation* section. Apply granular formulations using a suitable granular applicator.

Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Treflan EC (545 g/L) plus Sencor 500 F (500 g/L) (Spring application only.) Controls several grassy and broadleaf weeds including wild mustard and stinkweed. See *Field Crops Chart.* Use only on the varieties KG 20 and McCall. Do not use on soils with a pH of greater than 7.5 or with a soil organic matter content of less than two per cent or greater than 10 per cent. Apply Sencor only as a tank mix with Treflan. Apply in spring only as follows:

% Soil Organic Matter	Treflan (L/acre)	Sencor (L/acre)
2 - 6	0.61	0.172 - 0.223
6 - 10	0.81 - 1.05	0.223 - 0.344

Treflan and Sencor rates within these ranges vary according to soil type. Consult the label for additional information. The 1.05 L/acre rate of Treflan should be used in fields with greater than six per cent organic matter where wild oat densities are expected to be high. Apply in 45 L/acre water.

To tank mix, add the Sencor to a partially full tank. Maintain agitation while continuing to fill with water, then add Treflan. Use 50 mesh metal filters and nozzle screens. Incorporate according to the instructions outlined for Rival/Treflan/Triflurex in the *Herbicide Incorporation* section.

CAUTION: *This treatment may cause crop injury and yield loss if soybean emergence is slow due to cool weather, deep planting or seedling disease. Excessive moisture or drought during seedling growth also increases the potential for crop injury.*

Postemergence

Basagran (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Apply after the first trifoliolate leaf stage. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. For top growth control of Canada thistle apply Basagran at 0.71 L/acre when thistles are 6 to 8 inches (15 to 20 cm) high followed by a second application of 0.71 L/acre seven to ten days later. The addition of Citowett Plus at 2.5 L/1000 L or Assist Oil Concentrate at 5 to 10 L/1000 L spray mixture improves control of advanced weeds. Best results are obtained when Basagran is applied under high temperature conditions (21°C, 70°F).

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.42 L/acre in 45 L/acre water with a nozzle pressure of 40 psi (275 kPa). Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles. Direct nozzles 45° forward. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that a minimum water volume of 45 L/acre is used. Do not use flood jet nozzles. Apply at one to four leaf stage of the weeds, before they tiller. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will result in reduced weed control. Do not apply Hoe-Grass 284 if rain is expected within one hour. Do not apply broadleaf weed herbicides for four days after Hoe-Grass 284 application.

Poast (184 g/L) Controls several grassy weeds. See *Field Crops Chart.*

Weed	Rate (L/acre)
green and yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn	0.324 - 0.405
wild oats	0.57 - 0.65
volunteer wheat and oats	0.65
volunteer barley	0.77

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply Poast in 25 to 45 L/acre of water with Assist Oil Concentrate at 0.202 to 0.405 L/acre. Apply with stainless steel 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation or crop canopy is dense, use 45 to 80 L/acre of water with 0.81 L/acre of Assist and 45 psi (300 kPa) nozzle pressures. Apply when grassy weeds are in the one to six leaf stage, with the majority in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C (59°F), or less). Do not use flood jet or hollow cone nozzles. Do not harvest within 80 days of treatment. For aerial recommendations see Table 12.

Sugar Beets

TABLE 8. HERBICIDES FOR SUGAR BEETS

HERBICIDES	Barnyard Grass	Cereal Grains	Foxtail, green	Foxtail, yellow	Wild oats	Quack grass	Buckwheat, wild	Chickweed	Henbit	Kochia	Lamb's quarters	Mustard, wild	Nightshade	Pigweed, prostrate	Pigweed, red root	Pigweed, tumble	Purslane	Shepherd's purse	Annual smartweed species, lady's thumb	Stinkweed
Avadex					●															
Basfapon/Dalapon/ Dowpon/Dowpon M			●	●																
Betanal			●	●			●			●	●	●								
Betanex							●				●	●			●					●
Carbyne 2 EC					●															
Eptam	●	●	●	●	●	S		●	●		●		●	●	●	●	●			
Gramoxone[a]	CONTROLS ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS																			
Herbicide 273							●												●	
Hoe-Grass 284	●		●	●	●															
Nortron	●	●	●	●	●					●	●				●		●	●	●	
Poast	●	●	●	●	●															
Ro-Neet	●		●	●	●				●		●		●		●		●			
Roundup[a]	CONTROLS ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS																			
TCA (Bar-fox/NaTA TCA/TCA Solution)			●	●																

LEGEND

[a] Apply to emerged weeds before or after planting but before sugar beets emerge.
● Controlled by rates recommended for use in sugar beets.
S Suppression only.

Sugar beets are grown in Manitoba under contract to Manitoba Sugar Company. Crop production is closely supervised by its agricultural field staff. Consult with company personnel regarding any weed problems.

Herbicides are applied to sugar beets either preplant incorporated, preemergence or postemergence or in combination of the two or all three ways. When one herbicide follows a previously applied treatment or the crop is in a stress condition, the rate of each subsequent treatment should be cautiously applied at the minimum recommended rate to avoid crop injury.

Herbicides requiring deep soil incorporation in spring are used at the risk of losing seedbed moisture for germination of the beet seed. This hazard tends to limit the use of chemicals that need spring incorporation in Manitoba. Fall applied herbicides avoid this problem but may predispose soils to erosion. Such herbicides may be followed at reduced rates by pre or postemergence herbicides in spring where necessary to control any escaped weeds. However, one is cautioned not to apply postemergence herbicides following preplant sprays until conditions are favourable for their safe use.

All rates given are for an overall application. Chemical use can be reduced to one-third when applying a 7 inch (17.5 cm) band on the row. This is the general method of application for many of the chemicals.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats. The liquid formulation is best suited for spring application, while the granular formulation is best suited for use in fall. Apply rate recommended in fall or before seeding in the spring.

	SOIL ORGANIC MATTER		
	Less than 2%	**2 – 4%**	**More than 4%**
Fall Granular	5.7 kg/acre	6.9 kg/acre	8.9 kg/acre
Spring Granular	6.9 kg/acre	6.9 kg/acre	8.9 kg/acre
Fall Liquid*	not recommended	not recommended	not recommended
Spring Liquid	1.72 L/acre	1.72 L/acre	2.23 L/acre

*Application of liquid formulations in the fall may predispose fields to erosion and is not recommended.

For fall applications, apply granules between September 15 and freeze-up. Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator.

Refer to the *Herbicide Incorporation* section for incorporation instructions. Fall application is recommended to avoid seedbed drying. Spring application can be done but caution is required to preserve seedbed moisture.

Avadex BW liquid may be applied with liquid fertilizer, or on a granular urea fertilizer. Refer to the *Herbicide Incorporation* section for instructions regarding application and use on dry urea fertilizer. For aerial recommendations see Table 12. Do not seed domestic oats the year after treatment with Avadex BW.

Eptam 8-E (800 g/L) Although registered for fall application in sugar beets, application and incorporation requirements predispose soils to erosion and this use is not recommended.

Ro-Neet 7.2 E (720 g/L) Controls wild oats, green and yellow foxtail and several broadleaf weeds. (Table 8) Apply in the spring only at 2.53 to 3.14 L/acre in 80 to 160 L/acre water. Use the lower rate on light textured soils. Incorporate thoroughly taking special precautions to avoid loss of seedbed moisture. See the *Herbicide Incorporation* section for specific incorporation instructions.

Preplant Incorporated, Preemergence

Nortron (180 g/L) Controls wild oats, green and yellow foxtail, barnyard grass, volunteer cereal grains and several broadleaf weeds. (Table 8) Apply 3.44 to 8.9 L/acre in 60 to 220 L/acre water and incorporate according to instructions in the *Herbicide Incorporation* section. Use the lower rate on light textured soils and the higher rate on heavier soils. Rainfall is required for activation when used as a preemergence treatment. Thoroughly till before planting the next crop. The addition of Bar-fox or NaTA TCA at 2.12 to 3.2 kg/acre product or TCA solution at 3.2 to 4.78 L/acre will improve control of green foxtail and barnyard grass. Addition of Ro-Neet at 1.52 to 2.12 L/acre to Nortron will improve control of lamb's-quarters.

Preemergence

Bar-fox see TCA.

Gramoxone (200 g/L) Controls seedling weeds. Apply 1.11 to 2.23 L/acre in 120 to 220 L/acre water. Seedling weeds that have emerged before beets show above ground will be controlled by Gramoxone. Do not apply after beet emergence since Gramoxone burns all green vegetation.

NaTA TCA (85%) see TCA.

Roundup (356 g/L) Controls annual weeds. Apply 0.91 L/acre in 45 L/acre water, to actively growing grasses and broadleaf weeds less than 6 inches (15 cm) tall. If weeds are over 6 inches (15 cm) tall, apply 1.42 L/acre. Apply to emerged weeds before or after planting, but before beets show above the ground. Do not apply after beet emergence as Roundup will kill all green vegetation. Allow at least three days after treatment before disturbing the soil.

TCA [Bar-fox (83%), NaTA TCA (83%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 2.53 to 4.0 kg/acre product NaTA TCA or 4.45 to 6.07 L/acre TCA Solution in 45 L/acre water. Apply at planting time or immediately after. Precipitation is required for activation. Do not feed TCA treated beet tops to livestock.

Postemergence

Bar-fox see TCA.

Basfapon (74%), Dalapon (74%), Dowpon M (74%) Controls green and yellow foxtail. Apply 0.445 to 0.89 kg/acre product Dalapon or Dowpon M or 0.445 to 0.71 kg/acre product Basfapon in a minimum of 45 L/acre water. Apply when foxtail is from the seedling to three leaf stage, and beets have two to four leaves. Beet tops or roots may be fed to livestock.

Betanal (150 g/L) Controls green and yellow foxtail and several broadleaf weeds. (Table 8) Apply 3.84 to 4.45 L/acre in not more than 28 L water per 1 L Betanal when kochia is less than 1 inch (2.5 cm) in height or diameter and prior to the four leaf stage of other weeds. Too much water may cause precipitation. When Betanal is used in combination with a preplant or preemergence herbicide, use at the rate of 2.83 to 3.84 L/acre. For control of later germinating weeds, make a second application at 2.83 to 3.84 L/acre. Allow at least seven days between first and second applications. For improved control of annual smartweed species and wild buckwheat use Betanal at 2.83 L/acre tank mixed with Herbicide 273 at 0.61 to 1.32 L/acre. Use the higher rate of Herbicide 273 only on well established four to six leaf beets which are not under stress.

Betanex (150 g/L) Controls several broadleaf weeds. (Table 8) Apply 2.23 to 3.84 L/acre in 80 to 160 L/acre water before wild buckwheat and stinkweed reach the two leaf stage and prior to the four leaf stage of red root pigweed, lamb's quarters and wild mustard. For control of later germinating weeds, make a second application at 2.23 to 3.84 L/acre. Allow at least seven days between first and second application. For improved control of annual smartweed species and wild buckwheat, use Betanex at 2.83 L/acre tank mixed with Herbicide 273 at 0.61 to 1.32 L/acre. Use the higher rate of Herbicide 273 only on well established four to six leaf beets which are not under stress.

Betanal (150 g/L) and Betanex (150 g/L) Controls weeds susceptible to Betanal and Betanex. Mix volume for volume and apply the mix at 2.23 to 3.84 L/acre in 80 to 160 L/acre water. For control of later germinating weeds, make a second application of a 1:1 tank mix at 2.23 to 2.83 L/acre. Allow at least seven days between first and second application.

For improved control of annual smartweed species and wild buckwheat use Betanal at 1.42 L/acre plus Betanex at 1.42 L/acre tank mixed with Herbicide 273 at 0.61 to 1.32 L/acre. Use the higher rate of Herbicide 273 only on well established four to six leaf beets which are not under stress.

Precautions required when using Betanal and Betanex include avoiding spraying when the crop is under stress from rapid climatic change from cool, overcast to hot, bright days, windy conditions, drought, use of preemergent herbicides, insect or disease injury, and close cultivation. Under such circumstances it is recommended to delay application until conditions are more favourable. Do not spray while dew is present or if rainfall is expected within six hours.

NOTE: *Evening spraying is recommended*

Carbyne 2EC (240 g/L) Controls wild oats. Apply at 0.71 to 1.42 L/acre in 20 L/acre water. Direct nozzles 45° forward and use a nozzle pressure of 45 psi (300 kPa). When applying with a spray coupe, use 50 to 60 psi (350 to 450 kPa) nozzle pressures and ground speeds of 10 to 15 km/h (6 to 9 mph). Application should be made when the majority of wild oats are in the two leaf stage. Do not spray when foliage is wet from dew or rain. At the higher rate some buckwheat control can be expected as well.

Fusilade (250 g/L) Fusilade was available for use in sugar beets under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep or Weed Supervisor or Chipman representative.

Herbicide 273 (360 g/L) Controls several broadleaf weeds (Table 8). Apply 0.91 to 1.92 L/acre in 40 to 110 L/acre water. Apply when beets are in the four leaf stage and temperature is between 15° to 26°C. Use rates proportional to weed size and lower rates where herbicides were applied previously. Do not apply later than 40 days after beet emergence.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water with nozzles directed 45° forward. Spray at one to four leaf stage of the weeds, before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing may result in a reduction in weed control. Other herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

NaTA TCA (85%) see TCA.

Poast (184 g/L) Controls several grassy weeds. See Table 8.

Apply:

Weed	**Rate (L/acre)**
green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn	0.324 - 0.405
wild oats	0.57 - 0.65
volunteer wheat and oats	0.65
volunteer barley	0.77
quackgrass suppression	1.78

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. For suppression of quackgrass, apply Poast at the one to three leaf stage of the weed. Rhizomes should be thoroughly fragmented by spring tillage prior to application of Poast. An inter-row cultivation should be performed no sooner than seven days after application to enhance control. Suppression will normally last six to eight weeks. Poor results will occur if the rhizomes are not thoroughly fragmented or if the quackgrass is not actively growing at the time of treatment. Apply no later than 85 days prior to harvest.

Apply Poast with Assist Oil Concentrate at 0.202 to 0.405 L/acre. Apply with stainless steel 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation or crop canopy is dense, use 45 to 60 L/acre of water with 0.81 L/acre of Assist and 45 psi (300 kPa) nozzle pressures. Apply when grassy weeds are in the one to six leaf stage, with the majority in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C (59°F) or less). Do not use flood jet or hollow cone nozzles. For aerial recommendations see Table 12.

TCA [Bar-fox (83%), NaTA TCA (85%), TCA Solution (568 g/L)] Controls green and yellow foxtail. Apply 1.81 kg/acre product NaTA TCA or Bar-fox or 2.23 to 3.64 L/acre TCA Solution in 45 L/acre water. Apply before the foxtail is 2 inches (5 cm) tall and before sugar beets have four leaves. Do not feed TCA treated beet tops to livestock.

Sunflowers

TABLE 9. SUMMARY OF SUNFLOWER RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Table 19 for complete weed spectrum.

HERBICIDE	Crop Tolerance	Barnyard grass	Foxtail, yellow and green	Wild oats	Buckwheat, wild	Catchfly, night flowering	Chickweed	Cleavers	Cow cockle	Cocklebur	Flixweed	Hemp nettle	Kochia	Lamb's quarters	Mustard, wild	Pigweed, red root	Quackgrass	Russian thistle	Smartweed, annual species	Stinkweed	Thistle, sow (perennial)	Thistle, Canada
Amiben + Treflan	G	G	G	F	F		G		G													
Eptam	G	G	G	G			G							G	P	G		G	P	P		
Hoe-Grass 284[1]	G	G	G	G										G		G						
Mataven	E			G																		
Rival/Treflan/Triflurex	E	G	G	F	F		G		G					G		G		G				

LEGEND

	Crop Tolerance	Weed Control
E — Excellent	Consistently exhibits a high degree of tolerance over a wide range of growing conditions.	Consistently provides a high degree of control over a wide range of growing conditions.
G — Good	Exhibits acceptable crop tolerance under most growing conditions.	Provides acceptable control under most growing conditions.
F — Fair	Tolerance is variable depending on growing conditions.	Control is variable depending on growing conditions.
P — Poor	Tolerance is often unacceptable.	May provide some suppression but control is often unacceptable.

[1] Check text for varietal restrictions.

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Amiben (240 g/L) plus Treflan EC (545 g/L) Controls wild oats, green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Table 9 and Field Crops Chart.* Apply Amiben at 3.74 L/acre *only as a tank mix* with Treflan at 0.61 to 0.81 L/acre in at least 45 L/acre water. Apply to a dry soil surface in the spring before planting, and incorporate immediately (within 24 hours) according to instructions for Treflan in the *Herbicide Incorporation* section.

Eptam 8-E (800 g/L), Eptam 10 G (10%) Controls wild oats, green and yellow foxtail, barnyard grass, and several broadleaf weeds. See *Table 9 and Field Crops Chart.*

Spring application

Apply 1.72 L/acre or 13.8 kg/acre granular product. Apply liquid in a minimum of 45 L/acre water, and granular product with a suitable granular applicator. Eptam must be applied to a dry soil surface of a well prepared seedbed. Incorporate immediately following instructions in the *Herbicide Incorporation* section. Do not use on soils with less than three per cent organic matter.

Fall application

Application and incorporation requirements for fall application of Eptam 8-E and Eptam 10 G predispose soils to erosion and this use is not recommended.

Eptam 8-E may be applied with liquid fertilizer, or on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

Rival (500 g/L), Rival 10 G (10%), Treflan EC (545 g/L), Treflan QR 5 (5%), Triflurex (400 g/L) Controls green and yellow foxtail and several broadleaf weeds. Suppresses wild oats and wild buckwheat. See *Table 9 and Field Crops Chart.*

Spring application

	SOIL TYPE	
Product	**Light soils with less than 6% organic matter**	**Medium to heavy soils with 6–15% organic matter**
Rival	0.65 L/acre	0.9 - 1.1 L/acre
Rival 10 G	3.4 kg/acre	4.45 - 5.7 kg/acre
Treflan EC	0.61 L/acre	0.81 - 1.05 L/acre
Treflan QR 5	6.9 kg/acre	8.9 - 11.3 kg/acre
Triflurex	0.81 L/acre	1.1 L/acre

Fall applications (September 1 to freeze-up)

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

	SOIL TYPE	
Product	Light soils with less than 6% organic matter	Medium to heavy soils with 6–15% organic matter
Rival 10 G	4.45 kg/acre*	5.7 - 6.9 kg/acre
Treflan QR 5	8.9 kg/acre*	11.3 - 13.8 kg/acre

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. Where a rate range is specified, use the heavier rate where heavy infestations of wild oats are expected. Incorporate according to instructions in the *Herbicide Incorporation* section. Treflan leaves a residue in the soil which may affect subsequent crops. See Table 17 for a list of susceptible crops.

Postemergence

Sunflowers are extremely sensitive to broadleaf herbicides such as 2,4-D, MCPA and Banvel. Ensure that sprayers are thoroughly cleaned before applying herbicides to sunflowers. The Manitoba Agriculture publication *Field Sprayers* contains detailed instructions on cleaning sprayers.

Fusilade (250 g/L) Fusilade was available for use in sunflowers, under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, and barnyard grass. Apply 1.01 L/acre in at least 45 L/acre water with nozzles directed 45° forward. Apply at one to four leaf stage and before tillering of the weeds. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will cause a reduction in weed control. Do not use Hoe-Grass 284 if rain is expected within one hour. Herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour. Do not apply in hot, humid weather as crop injury may result. Do not apply to the variety Corona.

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats. Apply Mataven or Mataven L at 2.02 to 2.63 L/acre broadcast or 2.63 L/acre as a band application in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of the wild oats are in the three to six leaf stage and before the crop forms a canopy. Direct nozzles at a 45° angle forward. Treatment of wild oats at the early leaf stage will increase crop yields by reducing competition. For aerial recommendations see Table 12.

Perennial Weed Control

(Summerfallow or After Harvest)

Perennial Thistles

Canada thistle and perennial sow-thistle control requires a combined program of treatment in the crop and in stubble after harvest. Control on summerfallow can also be used as a part of a combination program. **Follow a program of using a recommended control in the crop and one of the following after harvest or on summerfallow:**

Kil-mor (500 g/L) Apply 0.45 to 0.71 L/acre in at least 45 L/acre water when thistles are actively growing after harvest. Do not cultivate before treatment and allow three weeks after treatment before cultivation. On summerfallow apply when thistles are in the early bud stage and allow three weeks after treatment before resuming normal summerfallow tillage.

MCPA amine and sodium salt Apply 0.91 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water. For product volumes of other MCPA formulations see Table 14. Refer to Kil-mor recommendation for additional detail on tillage.

Target (400 g/L) Apply 0.61 to 0.81 L/acre in a minimum of 45 L/acre water. Apply after harvest when thistles have 6 to 8 inches (15 to 20 cm) of regrowth. Do not cultivate before treatment and allow three weeks after treatment before cultivation. On summerfallow, apply when thistles are in the early bud stage and allow three weeks after treatment before resuming normal summerfallow tillage.

2,4-D amine Apply 0.91 L/acre of 2,4-D (500 g/L) in 45 L/acre water. Product volumes of various 2,4-D formulations are given in Table 14. Refer to Kil-mor recommendation for additional detail on tillage.

The following treatments generally give a higher level of perennial thistle control. Due to treatment cost, patch treatment is recommended.

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water for patch treatment of thistles. Apply when thistles are in the early flowering stage. Use the higher rate during periods of cool or dry weather. Allow three weeks after treatment before cultivation. Do not apply after October 1.

Banvel (480 g/L) Apply 1.01 L/acre in 45 to 80 L/acre water when thistles are actively growing after harvest and at least two weeks before killing frost. Allow three weeks after treatment before cultivating. On summerfallow, apply when thistles are in the early bud stage and allow three weeks after treatment before resuming normal summerfallow tillage. Grow only cereals, soybeans or field corn the year after application. If application is made after September 1, or if very dry conditions persist after application, injury to crops (including cereals, soybeans and field corn) may occur in the spring following application. Do not graze or harvest for dairy feed within 14 days of application. Meat animals grazed on or fed forage harvested within 30 days of Banvel application should not be slaughtered until a further 30 day period has elapsed.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Roundup (356 g/L) For Canada thistle control, apply 2.43 L/acre in 45 L/acre water or 75 to 125 mL in 6.5 L water/1076 sq. ft. (100 square metres). Use when the Canada thistle is in the bud to bloom stage and actively growing so sufficient movement of the chemical will occur into the root systems of perennial plants to give effective control. For perennial sow-thistle control, apply 2.83 to 4.86 L/acre in 45 L/acre water. Do not cultivate for at least five days after treatment for Canada thistle and wait at least seven days for perennial sow-thistle. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Roundup (356 g/L) For Canada thistle control, on summerfallow only, apply 1.01 L/acre in 20 to 45 L/acre of clean water. Use when the Canada thistle is in the rosette stage. The last summerfallow tillage prior to the spray operation should be performed between July 15 and August 1. Allow a minimum of five weeks for regrowth of the Canada thistle rosettes prior to spraying. Do not cultivate for at least five days after treatment of Canada thistle. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occuring within six hours after application may reduce effectiveness. Do not apply if the Canada thistle is under stress and is not actively growing.

Quackgrass

See the fact sheet *Integrated Weed Control Recommendations* for tillage recommendations for quackgrass control.

Amitrol T, Basfapon, Dalapon, Dowpon M and TCA are registered for quackgrass control but are not recommended as level of control is generally less than with the following recommendations.

Long Term Control

Roundup (356 g/L) Apply 1.92 to 2.83 L/acre in 45 L/acre water or 75 to 125 mL in 6.5 L water/1076 square feet (100 square meters). Use when quackgrass is at least 8 inches (20 cm) tall and actively growing. Use the high rate when quackgrass is in a sodbound situation, a dense infestation that has been undisturbed for two or more years. If a frost occurs, wait several days to determine if the quackgrass has recovered. Quackgrass can be treated after a mild frost provided there are three to four green leaves actively growing at the time of application. Spray coverage should be uniform and complete. Do not spray to runoff. Do not cultivate before treatment or for at least five days after treatment to allow for movement of the chemical to the roots. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness. If quackgrass has been mowed, do not treat until regrowth has reached the recommended stage.

Season Long Control

Roundup at the reduced rate of 1.01 L/acre in the fall will provide top growth control of quackgrass for the next growing season. Apply in 20 to 45 L/acre of clean water using flat fan nozzles when quackgrass is at least 8 inches (20 cm) in height with three to four leaves and actively growing. Do not till between harvest and fall application. Allow at least five days after application before tillage. If frost has occurred wait several days to determine if the quackgrass has recovered. Quackgrass can be treated after a mild frost provided there are three to four leaves actively growing at the time of application. If quackgrass is sodbound (dense infestations undisturbed for two or more years) control will be reduced. Retreatment of quackgrass patches may be required on an annual basis. Vigorous crop competition will improve control.

Fall Weed Control for Winter Annuals

Fall tillage to control annual weeds should be shallow to avoid burying seeds below a depth of 3 inches (8 cm).

Cobutox (400 g/L), Embutox E (400 g/L), 2,4-D Butyric 400 (400 g/L) Controls seedling narrow-leaved hawk's-beard in alfalfa. Apply 1.42 L/acre in 60 to 80 L/acre water after legume growth ceases.

MCPA amine or mixtures of sodium and potassium salts or 2,4-D amine or LV ester Controls winter annuals such as flixweed, stinkweed and shepherd's purse. Apply 0.45 L/acre of formulations containing 500 g/L MCPA or 2,4-D in 45 L/acre water in late fall before freeze-up. Product volumes of other MCPA and 2,4-D formulations are given in Table 14.

Chemical Fallow

To ensure the success of a chemical summerfallow program, winter annual weeds (eg. stinkweed, shepherd's purse) must be controlled with 2,4-D or MCPA after harvest (preferred) or by an early spring application in the following year.

Roundup (356 g/L) Controls annual grasses, quackgrass, and several annual and perennial broadleaf weeds including absinthe, annual blue grass, annual sow thistle, Canada blue grass, Canada thistle, cattail, common milkweed, common ragweed, curled dock, downy brome, field bindweed, green and yellow foxtail, hemp dogbane, hoary cress, Kentucky blue grass, knotweed, kochia, lady's thumb, lamb's quarters, prickly lettuce, mustard, poison ivy, quackgrass, red root pigweed, Russian thistle, shepherd's purse, smooth brome grass, toadflax, wild buckwheat, wild oats and wild vetch.

Apply 0.304 L/acre of Roundup plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water for annuals less than 3 inches (8 cm) tall or 0.405 L/acre of Roundup plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water for annuals greater than 3 inches (8 cm) tall.

Roundup at the above rates can be tank mixed with 0.117 L/acre of Banvel or 0.253 L/acre of Torch DS or with 0.4 L/acre Pardner or with 0.453 L/acre of 2,4-D amine (500 g/L) plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water. For rates of other 2,4-D formulations see Table 14. For weeds controlled see Table 10. For perennial weed control consult the *Perennial Weed Control Section* and *Special Weed Problems Section.* Do not apply when weeds are under stress conditions such as drought or extreme temperatures. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Sweep (250 g/L) Controls wild oats, green and yellow foxtail, and volunteer cereal grains. Apply 0.91 L/acre in a minimum of 45 L/acre water. Apply when weeds are in the two to four leaf stage. If broadleaf weeds are present, Sweep may be tank mixed with a broadleaf herbicide such as 2,4-D, MCPA, Banvel plus 2,4-D, Dyvel, Kil-mor, Buctril M, Afolan F or Lorox L plus MCPA at recommended rates. Do not apply Afolan F or Lorox L more than once during the season. See Table 10 for list of broadleaf weeds controlled with these tank mixes.

CAUTION: *Some herbicides recommended above can leave residues which may affect growth of crops seeded in the following year, consult Table 17 or the herbicide labels for crops which may safely be planted in the rotation.*

TABLE 10. SUMMARY OF CHEMICAL FALLOW RECOMMENDATIONS

HERBICIDE	Buckwheat, wild	Cow cockle	Flixweed	Foxtail, barley	Foxtail, green	Kochia	Lady's thumb	Lamb's quarters	Mustard, wild	Pigweed, red root	Russian thistle	Stinkweed	Volunteer cereals	Volunteer rapeseed	Wild oats
Roundup				S	●		●		●			●	●	●	●
Roundup + Banvel		●	●[1]	S	●	●	●	●	●		●	●	●	●	●
Roundup + Pardner or Torch DS	●[1]			S	●		●		●			●	●	●	
Roundup + 2,4-D amine			●	S	●[1]	●	●		●	●		●	●	●	●[1]
Sweep[2]				S[2]	●								●		●
Sweep[2] + Afolan F/Lorox L[3] + MCPA amine	●	●	●	S[2]	●	●	●	●	●	●		●	●	●	●
Sweep[2] + Bromox 720 M, Buctril M or Sabre	●	●	●	S[2]	●	●	●	●	●	●	●	●	●	●	●
Sweep[2] + Banvel plus 2,4-D	●	●	●	S[2]	●	●	●	●	●	●	●	●	●	●	●
Sweep[2] + MCPA			●	S[2]	●			●	●			●	●	●	●
Sweep[2] + 2,4-D			●	S[2]	●			●	●		●	●	●	●	●

LEGEND

● Controlled by rates recommended for chemical fallow.

S Suppression.

S[2] Sweep will provide burn off of above ground green foliage, foxtail barley being a perennial will regrow from the crown.

[1] Controlled with the 0.405 L/acre rate of Roundup only.

[2] Sweep is a contact herbicide that will burn off above ground green foliage, there can be regrowth if spray coverage is not complete or if weeds are beyond recommended stage of application.

[3] Do not apply Afolan F or Lorox L more than once during the season.

Zero Tillage

Roundup (356 g/L) plus a non-ionic surfactant Controls wild oats, green and yellow foxtail and wild mustard. Apply 0.445 L/acre of Roundup plus 0.142 L/acre of a non-ionic surfactant in 45 L/acre of clear water.

Application should be made just prior to seeding, or after seeding but before crop emergence. Apply when weeds are in the seedling stage, not more than 6 inches (15 cm) high. Heavy rainfall within two hours after application may wash the chemical off the foliage and repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Roundup (356 g/L) plus a non-ionic surfactant, plus Pardner (280 g/L), or Torch DS (450 g/L) Controls wild oats, green and yellow foxtail, volunteer cereal grains, lady's thumb, lamb's quarters, wild buckwheat and wild mustard. Apply the same rate of Roundup plus surfactant as above plus 0.40 L/acre of Pardner or 0.283 L/acre of Torch DS in 45 L/acre of clear water. Heavy rainfall within two hours after application may wash the chemical off the foliage and repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Seedling Forage Crops

Plan your weed control program before seeding forage crops. Consider the weeds found in the field and control measures available. Perennial crops reduce flexibility and require long term planning. Effective weed control before planting and in the establishment year reduces weed problems for the remainder of the stand life.

Most forage crops are competitive and suppress weed growth. Once the forage is established, annual weeds will have difficulty becoming established. Perennial weeds may be a problem and shorten the life of the forage stand. Control perennial weeds before establishment of forage crops or plan for adequate control in the crop.

When mixed stands of grasses and legumes are grown, herbicide choice is limited. Be sure the herbicide can be used on all forages in the mixture. For grass-legume mixes use of broadleaf herbicides will be most limited by the legume while use of herbicides for grassy weed control will be most restricted by the forage grass.

Cover crops also limit herbicide use. Be sure the herbicide is recommended for both the forage and cover crop. The *Forage Crops Chart* contains a summary of recommended herbicides.

Seedling Legumes

Preplant or Preemergence (but postemergence to weeds)

Roundup (356 g/L) Controls annual broadleaf and grass weeds. See *Forage Crops Chart.* Apply 0.91 to 1.42 L/acre in 45 to 120 L/acre water to emerged vegetation before or after planting but prior to forage legumes emerging. Use the higher rate when weeds are greater than 6 inches (15 cm) tall. See the *Special Weed Problems* section for information on controlling perennial weeds with Roundup.

Seedling Alfalfa

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats in alfalfa sown with a barley, canola, flax or wheat cover crop. Apply according to the recommendations outlined for the particular companion crop to be used. Do not seed alfalfa until after the herbicide has been applied and incorporated.

Eptam 8-E (800 g/L), Eptam 10 G (10%) Controls wild oats, green and yellow foxtail, barnyard grass, volunteer cereal grains and several broadleaf weeds. See *Forage Crops Chart.* Use only on alfalfa sown alone. Apply 1.72 L/acre or 13.8 kg/acre granular product in the spring. Apply liquid in a minimum of 45 L/acre water. The granular product should be applied with a suitable granular applicator. Eptam must be applied to the dry soil surface of a well prepared seedbed. See the *Herbicide Incorporation* section for incorporation instructions. Temporary crop stunting and sealing of the first leaves will occur in legumes if conditions for germination and growth are not optimum.

Eptam 8-E may be applied on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

Postemergence

Asulox F (400 g/L) Controls wild oats, suppresses green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Forage Crops Chart.* May be applied to alfalfa alone or alfalfa seeded with a flax companion crop. Apply 1.11 L/acre in 25 to 45 L/acre water. Use when wild oats are in the two to four leaf stage. Do not graze or harvest for livestock feed in the treatment year.

Asulox F (400 g/L) plus Embutox E (400 g/L) Controls wild oats and several broadleaf weeds, suppresses green and yellow foxtail. See *Forage Crops Chart.* Do not use if a companion crop is planted with alfalfa. Apply 1.11 L/acre Asulox F tank mixed with Embutox E at 0.61 L/acre in 25 to 45 L/acre water when wild oats are in the two to four leaf stage. Do not graze or harvest for livestock feed in the treatment year.

Avenge 200 C (200 g/L) Controls wild oats in alfalfa sown with a barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa or Selkirk only) cover crop. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the high rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in the direction of travel. Apply to a dry crop (no dew or rain) before the cover crop is in the six leaf stage and when wild oats are in the three to five leaf stage. Do not apply to crops under drought stress. Do not graze or harvest the treated alfalfa for forage in the year of treatment. Do not apply if rain is forecast within six hours. Allow a four day interval between application of Avenge and herbicides for control of broadleaf weeds. Avenge 200-C may be applied by floater type equipment. The use of postemergence boom kits, equipped with flat fan nozzles, is recommended. Nozzle pressure should be 40 psi (275 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control. Avenge 200-C may be applied with a Spray Coupe, provided speed is reduced to 16 to 20 km/h (10 to 12 mph) and equipment is calibrated to apply at least 20 to 25 L/acre of the solution under at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%) Controls green and yellow foxtail, and barnyard grass.

If alfalfa is seeded alone, apply Basfapon at 0.91 to 1.62 kg/acre product, Dalapon at 0.91 to 1.32 kg/acre product, Dowpon or Dowpon M at 0.89 to 1.38 kg/acre product in 120 L/acre water when the grass seedlings are small and the alfalfa is 2 to 3 inches (5 to 8 cm) tall. Do not feed first year cuttings to dairy animals, or animals being finished for slaughter.

If alfalfa is underseeded with flax, apply Basfapon, Dalapon, Dowpon or Dowpon M at 0.445 to 0.71 kg/acre product in 120 L/acre water before foxtail or barnyard grass reaches the three leaf stage and when flax is 4 to 8 inches (10 to 15 cm) tall.

Cobutox (400 g/L), Embutox E (400 g/L), 2,4-D Butyric 400 (400 g/L) Controls several broadleaf weeds. See *Forage Crops Chart.* May be applied to alfalfa alone or alfalfa underseeded to barley, oats or wheat companion crop. Apply 1.21 to 1.42 L/acre in 60 to 80 L/acre water when the alfalfa is in the first to third trifoliolate leaf stage. If wild mustard is beyond the four leaf stage, Cobutox or Embutox E at the reduced rate of 0.81 L/acre may be tank mixed with MCPA sodium salt (300 g/L) at 0.047 L/acre. For product volumes of other MCPA formulations see Table 14. This tank mix may increase crop damage.

For control of narrow-leaved hawk's beard seedlings apply Cobutox, Embutox E or 2,4-D Butyric 400 at 1.42 L/acre in 60 to 80 L/acre water in fall, after legume growth ends.

Dalapon see Basfapon.

Dowpon M see Basfapon.

Embutox E see Cobutox.

Fusilade (250 g/L) Fusilade was available for use in seedling alfalfa, under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass in alfalfa seeded alone or with a wheat, barley (except for varieties Betzes, Glenn, Klages and Norbert) or flax companion crop. Apply 1.01 L/acre in at least 45 L/acre water with a nozzle pressure of 40 psi (275 kPa) directing nozzles 45° forward. Apply at one to four leaf stage of the weeds, before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will cause a reduction in weed control. Do not use Hoe-Grass 284 if rain is expected within one hour. Other herbicides for broadleaf weed control must be applied at least four days after the Hoe-Grass 284 application. Do not graze or harvest for livestock feed in the treatment year.

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats. Apply to alfalfa alone or with a wheat companion crop. Use only on wheat varieties recommended for production in Manitoba. See *1986 Field Crop Variety Recommendations.* Apply Mataven or Mataven L at 2.02 L/acre in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of wild oats are in the three to six leaf stage. Direct nozzles forward 45°. Treatment at the three to four leaf stage of wild oats will provide a greater increase in crop yields by reducing wild oat competition early. Allow a seven day interval before application of Mataven and broadleaf weed herbicides (eg. Cobutox, Embutox E, 2,4-D Butyric 400). Do not graze or harvest for livestock feed in the treatment year. For aerial recommendations see Table 12.

MCPA amine and potassium sodium salt mixtures. Controls several broadleaf weeds. See *Forage Crops Chart. Use only on alfalfa sown with a flax cover crop. See "NOTE" below.* Apply 0.283 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA formulations see Table 14. Apply in 60 to 80 L/acre water to reduce the risk of injury when the seedling legumes are in the first to third trifoliolate leaf stage. A good canopy formed by the companion crop and /or weeds will reduce the risk of injury. Spray before legumes reach 4 inches (10 cm) in height.

NOTE: The use of MCPA amine and potassium sodium salt mixtures on alfalfa with a cereal companion crop, while registered, is not recommended. Use of Cobutox, Embutox E or 2,4-D Butyric 400 is recommended when alfalfa is undersown to a cereal companion crop to minimize injury to alfalfa.

MCPA Sodium Salt (300 g/L) Controls several broadleaf weeds. See *Forage Crops Chart. Use only on alfalfa sown with a flax cover crop.* See "NOTE" below. Apply 0.49 to 0.57 L/acre in 60 to 80 L/acre water to reduce the risk of injury when the seedling legumes are in the first to third trifoliolate leaf stage. For product volumes of other MCPA formulations see Table 14.

NOTE: The use of MCPA sodium salt on alfalfa with a cereal companion crop, while registered, is not recommended. Use of Cobutox, Embutox E or 2,4-D

Butyric 400 is recommended when alfalfa is undersown to a cereal companion crop to minimize injury to alfalfa.

2,4-D amine The use of 2,4-D amine on alfalfa with a cereal cover crop, while registered, is not recommended as serious damage to alfalfa may result.

2,4-D Butyric 400 see Cobutox.

Seedling Birdsfoot Trefoil

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats in birdsfoot trefoil underseeded to barley, canola, flax or wheat. Apply according to the recommendations outlined for the particular companion crop to be used. Do not seed birdsfoot trefoil until after the herbicide has been applied and incorporated.

Eptam 8-E (800 g/L), Eptam 10 G (10%) *Spring application only.* Controls wild oats, green and yellow foxtail, barnyard grass, volunteer cereal grains and several broadleaf weeds. See *Forage Crops Chart.* Do not use Eptam if a grass or a companion crop is to be planted. Apply 1.72 L/acre or 13.8 kg/acre granular product. Apply liquid in a minimum of 45 L/acre water. Apply the granular product with a suitable granular applicator. Eptam should only be applied to the dry surface of a well prepared seedbed. Incorporate according to instructions in the *Herbicide Incorporation* section. Temporary crop stunting and sealing of the first leaves will occur in legumes if conditions for germination and growth are not optimum.

Eptam 8-E may be applied on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and incorporation.

Postemergence

Avenge 200 C (200 g/L) Controls wild oats in birdsfoot trefoil sown with a barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa, or Selkirk only) cover crop. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the high rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in the direction of travel. Apply to a dry crop (no dew or rain) before the cover crop is in the six leaf stage and when wild oats are in the three to five leaf stage. Do not apply Avenge 200-C to crops under drought stress. Do not graze or harvest the treated birdsfoot trefoil for forage in the year of treatment. Do not apply if rain is forecast within six hours. Allow a four day interval between application of Avenge and herbicides for control of broadleaf weeds. Avenge 200-C may be applied by floater type equipment. The use of postemergence boom kits, equipped with flat fan nozzles, is recommended. Nozzle pressure should be 40 psi (275 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control. Avenge 200-C may be applied with a Spray Coupe, provided speed is reduced to 16 to 20 km/h (10 to 12 mph) and equipment is calibrated to apply at least 25 to 40 L/acre of the solution under at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%) Controls green and yellow foxtail, barnyard grass.

If birdsfoot trefoil is seeded alone, apply Basfapon at 0.91 to 1.62 kg/acre product, Dalapon at 0.91 to 1.32 kg/acre product, or Dowpon or Dowpon M at 0.89 to 1.38 kg/acre product in 120 L/acre water when the grass seedlings are small and the birdsfoot trefoil is 2 to 3 inches (5 to 8 cm) tall. Do not feed first year cuttings to dairy animals, or animals being finished for slaughter.

If birdsfoot trefoil is underseed to flax, apply Basfapon, Dalapon, Dowpon or Dowpon M at 0.445 to 0.71 kg/acre product in 120 L/acre water before foxtail or barnyard grass reaches the three leaf stage and when flax is 4 to 6 inches (10 to 15 cm) tall.

Cobutox (400 g/L), Embutox E (400 g/L), 2,4-D Butyric 400 (400 g/L) Controls several broadleaf weeds. See *Forage Crops Chart.* May be applied to birdsfoot trefoil alone or birdsfoot trefoil seeded with a wheat, oats or barley companion crop. Apply 1.21 to 1.42 L/acre in 60 to 80 L/acre water when the birdsfoot trefoil is in the first to third trifoliolate leaf stage. If wild mustard is beyond the four leaf stage, Cobutox or Embutox E at the reduced rate of 0.81 L/acre may be tank mixed with MCPA sodium salt (300 g/L) at 0.047 L/acre. For product volumes of other MCPA formulations see Table 14. This tank mix may increase crop damage.

Embutox E see Cobutox.

Fusilade (250 g/L) Fusilade was available for use in seedling birdsfoot trefoil under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Mataven (84 g/L) Controls wild oats. Apply to birdsfoot trefoil alone or with a wheat companion crop. Use only on wheat varieties recommended for production in Manitoba. See *1986 Field Crop Variety Recommendations.* Apply 2.02 L/acre in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of wild oats are in the three to six leaf stage. Direct nozzles forward 45°. Treatment at the three to four leaf stage of wild oats will provide a greater increase in crop yields by reducing wild oat competition early. Allow a seven day interval before application of Mataven and broadleaf weed herbicides (eg. Cobutox, Embutox E, 2,4-D Butyric 400). Do not graze or harvest for livestock feed in the treatment year. For aerial recommendations see Table 12.

2-4-D Butyric 400 see Cobutox.

Seedling Clover
Alsike, Red and Sweet

Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (400 g/L), Avadex BW Granular (10%) Controls wild oats in alsike, red or sweet clover underseeded to barley, canola, flax or wheat. Apply according to the recommendations outlined for the particular companion crop to be used. Do not seed the clover until after the herbicide has been applied and incorporated.

Postemergence

Avenge 200 C (200 g/L) Controls wild oats in red or sweet clover sown with a barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa, or Selkirk only) cover crop. Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the high rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (276 kPa). Have nozzles spray at a 45° angle in the direction of travel. Apply to a dry crop (no dew or rain) before the cover crop is in the six leaf stage and when wild oats are in the three to five leaf stage. Do not apply Avenge 200-C to crops under drought stress. Do not graze or harvest the treated red or sweet clover for forage in the year of treatment. Do not apply if rain is forecast within six hours. Allow a four day interval between application of Avenge and herbicides for control of broadleaf weeds. Avenge 200-C may be applied by floater type equipment. The use of postemergence boom kits, equipped with flat fan nozzles, is recommended. Nozzle pressure should be 40 psi (275 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control. Avenge 200-C may be applied with a Spray Coupe, provided speed is reduced to 16 to 20 km/h (10 to 12 mph) and equipment is calibrated to apply at least 25 to 40 L/acre of the solution under at least 45 psi (300 kPa) pressure. For aerial recommendations see Table 12.

Cobutox (400 g/L), Embutox E (400 g/L), 2,4-D Butyric 400 (400 g/L) Controls several broadleaf weeds. See *Forage Crops Chart.* Apply to alsike or white dutch clover only. May be used when these clover species are seeded alone or with a barley, oat or wheat companion crop. Apply at 1.21 to 1.42 L/acre in 60 to 80 L/acre water volume. Use when clover is in the first to third trifoliolate leaf stage.

For control of narrow-leafed hawk's-beard seedlings apply Cobutox, Embutox E or 2,4-D Butyric 400 at 1.42 L/acre in 60 to 80 L/acre of water in the fall, after legume growth has ceased.

Embutox E see Cobutox.

Fusilade (250 g/L) Fusilade was available for use in seedling red clover under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. Apply to red or sweet clover only. May be used when these crops are seeded alone or with flax, barley (except for Betzes, Glenn, Norbert and Klages) or wheat companion crops. Use 1.01 L/acre in at least 45 L/acre water. Direct nozzles 45° forward. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles at 40 psi (275 kPa) pressure. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will result in reduced weed control. Do not use Hoe-Grass 284 if rain is expected within one hour. Apply at one to four leaf stage of the weeds, before they tiller. Other herbicides must be applied at least four days after Hoe-Grass 284 application. Do not graze or harvest for livestock feed in the treatment year.

Mataven (84 g/L) Controls wild oats. Apply to red clover only, alone or with a wheat companion crop. Use only on wheat varieties recommended for production in Manitoba. See *1986 Field Crop Variety Recommendations.* Apply 2.02 L/acre in 45 L/acre water at a minimum nozzle pressure of 45 psi (300 kPa) when the majority of wild oats are in the three to six leaf stage. Direct nozzles forward 45°. Treatment at the three to four leaf stage of wild oats will provide a greater increase in crop yields by reducing wild oat competition early. Allow a seven day interval before application of Mataven and broadleaf weed herbicides (eg. Cobutox, Embutox E, 2,4-D Butyric 400). Do not graze or harvest for livestock feed in the treatment year. For aerial recommendations see Table 12.

MCPA amine and potassium sodium salt mixtures Controls several broadleaf weeds. See *Forage Crops Chart. Use only on red or alsike clover sown with a flax cover crop.* See "NOTE" below. Apply 0.283 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA formulations see Table 14. Apply these chemicals in 60 to 80 L/acre water to reduce the risk of injury when the seedling legumes are in the first to third trifoliolate leaf stage. A good canopy formed by the companion crop and/or weeds will reduce the risk of injury. Do not spray legumes once a height of 4 inches (10 cm) is reached.

NOTE: The use of MCPA on clover with a cereal companion crop, while registered, is not recommended. Tropotox Plus is recommended for use with cereal companion crops to reduce the risk of clover injury.

MCPA sodium salt (300 g/L) Controls several broadleaf weeds. See *Forage Crops Chart. Use only on red or alsike clover sown with a flax cover crop.* See "NOTE" below. Apply 0.486 to 0.57 L/acre in 60 to 80 L/acre water to reduce the risk of injury when the seedling legumes are in the first to third trifoliolate leaf stage. Do not use on sweet clover. For product volumes of other MCPA formulations see Table 14.

NOTE: The use of MCPA on clover with a cereal companion crop, while registered, is not recommended. Tropotox Plus is recommended for use with cereal companion crops to reduce the risk of clover injury.

CAUTION: *Do not use MCPA on sweet clover at any stage of growth.*

Tropotox Plus (400 g/L) Controls several broadleaf weeds. See *Forage Crops Chart. Apply to red, alsike, and white dutch clover only.* May be applied to these crops seeded alone or with a barley, wheat or oat companion crop. Apply at 1.21 to 1.42 L/acre in 60 to 80 L/acre when the clover is in the first to third trifoliolate leaf stage.

2,4-D amine The use of 2,4-D amine on clovers with a cereal cover crop, while registered, is not recommended as serious damage to clover may result.

2,4-D Butyric 400 see Cobutox.

Seedling Grasses

Treflan residues in the soil may damage seedling forage grasses. Do not seed forage grasses for 18 months after a spring application or 22 months after a fall application of Treflan.

Preplant or Preemergence,
(But Postemergence to Weeds)

Roundup (356 g/L) Controls annual broadleaf and grass weeds. Apply 0.91 to 1.42 L/acre in 45 to 120 L/acre water. Apply to emerged vegetation prior to or after planting but before emergence of forage grasses. Use the high rate when weeds are greater than 6 inches (15 cm) tall. For control of perennial weed problems with Roundup, see the *Special Weed Problems* section.

Postemergence

Avenge 200 C (200 g/L) Controls wild oats in bromegrass, creeping red fescue, crested wheatgrass, Kentucky bluegrass, reed canarygrass, Russian wild ryegrass, or timothy underseeded to barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa or Selkirk only)Apply 1.42 to 1.72 L/acre in 45 L/acre water. Use the high rate when there are more than 18 wild oat plants per square foot (200 wild oat plants per square metre). Nozzle tip pressure should be 40 psi (275 kPa). Have nozzles spray at a 45° angle in the direction of travel. Apply to a dry crop (no dew or rain) when wild oats are in the three to five leaf stage and prior to the six leaf stage of the cover crop. Do not apply Avenge 200-C to crops under drought stress. Do not graze or harvest the seedling grasses for forage during the year of treatment. Do not apply if rain is forecast within six hours. Do not tank mix with any herbicides for broadleaf weed control. Allow a four day interval between application of Avenge and herbicides for control of broadleaf weeds. Avenge 200-C may be applied by floater type equipment. The use of postemergence boom kits, equipped with flat fan nozzles, is recommended. Nozzle pressure should be 40 psi (275 kPa) to deliver 45 L/acre solution, at speeds of 18 to 20 km/h (11 to 12 mph). Heavy dust created by the floater may interfere with the spray and reduce wild oat control. Avenge 200-C may be applied with a Spray Coupe, provided speed is reduced to 16 to 20 km/h (10 to 12 mph) and equipment is calibrated to apply at least 20 to 25 L/acre of the solution under at least 45 psi (300 kPa) pressure. Refer to Table 12 for aerial recommendations.

Banvel (480 g/L) Controls several broadleaf weeds. See *Forage Crops Chart. Apply to red fescue only.*

Red fescue alone

Apply at 0.236 L/acre in 45 L/acre water when the crop is 2 inches (5 cm) tall or in the three leaf stage. May be mixed with 2,4-D amine.

Red fescue sown with barley, oats or wheat cover crops.

Apply at 0.093 L/acre on barley or 0.118 L/acre on wheat or oat cover crops in 45 L/acre water. Apply when grasses are 2 inches (5 cm) tall or in the three leaf stage. May be mixed with 2,4-D in barley or wheat.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Buctril M (560 g/L) Controls several broadleaf weeds. See *Forage Crops Chart.* Apply to bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass, meadow fescue, orchardgrass, reed canarygrass, Russian wild ryegrass, slender wheatgrass, tall wheatgrass and timothy, alone or underseeded to wheat, barley, oats, or flax. Apply 0.405 L/acre in 60 L/acre water at a pressure of 40 psi (275 kPa) when forage grasses are in the two to four leaf stage and weeds are small. Do not graze or harvest for livestock feed in the year of application.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail and barnyard grass. *Apply to brome, intermediate wheat grass, Russian wild rye, creeping red fescue, or crested wheat grass only,* alone or with a barley (except for Betzes, Glenn, Klages or Norbert), flax or wheat cover crop, at 1.01 L/acre in at least 45 L/acre water with a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply at one to four leaf stage of the weeds, before they tiller. Operate ground equipment at 6 to 8 km/h (4 to 5 mph). Use 80° flat fan nozzles. When applying Hoe-Grass 284 through floater equipment, ensure that the boom is a maximum of 24 inches (60 cm) above the crop, that maximum speed is 18 km/h (11 mph) and that minimum water volume is 45 L/acre. Do not use flood jet nozzles. Application of Hoe-Grass 284 during periods of stress (above 28°C (82°F), dry conditions, or when humidity is low) when plants are not actively growing will result in reduced weed control. Do not use Hoe-Grass 284 if rain is expected within one hour. Herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Use only in the year of establishment and do not graze or harvest for livestock feed in the treatment year.

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats. Apply Mataven or Mataven L to bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass, meadow fescue or Russian wild ryegrass. May be applied when these grasses are seeded alone or with a wheat companion crop. Use only on wheat varieties recommended for production in Manitoba. See *1986 Field Crop Variety Recommendations.* Apply at 2.02 to 3.04 L/acre when the majority of wild oats are in the three to six leaf stage. Direct nozzles 45° forward. Use the high rate when grasses are grown without a companion crop and the low rate when grown with wheat as a companion crop. Do not graze or harvest for forage in the year of treatment. Allow at least four days between application of Mataven and application of Buctril M, Pardner, Torch DS or Weedar 80. Allow seven days before application of Banvel. For aerial recommendations see Table 12.

Pardner (280 g/L), Torch DS (450 g/L) Controls several broadleaf weeds. See *Forage Crops Chart.* Apply to bromegrass, crested wheatgrass, intermediate wheatgrass, slender wheatgrass, tall wheatgrass, meadow fescue, creeping red fescue, orchardgrass, reed canarygrass, Russian wild ryegrass and timothy. May be applied to these crops when grown alone or with a wheat, oat or barley companion crop. Torch DS may be applied when a flax companion crop is used.

Apply as follows:

Companion Crop	Product	Rate (L/acre)	Water Volume (L/acre)
Wheat, Oats, Barley	Torch DS	0.354	45
	Pardner	0.405 - 0.49	60
Flax	Torch DS	0.253	45
None	Torch DS	0.354	45
	Pardner	0.405 - 0.49	60

Apply when weeds are in the one to four leaf stage and seedling grasses are in the two to four leaf stage. Do not graze or harvest for forage in the year of treatment. Pardner may be tank mixed with 0.223 L/acre of Weedar.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Torch DS see Pardner.

Weedar 80 (2,4-D amine) (500 g/L) Apply to seedling grasses alone or with a barley or wheat companion crop. May be used on tame millet, but do not apply to Setaria species such as Siberian millet. Controls several broadleaf weeds. See *Forage Crops Chart.* Apply 0.223 to 0.445 L/acre in 45 L/acre water. Apply when grasses are in the three leaf to the shot blade stage. Where wild mustard, lamb's-quarters, and spring seedlings of stinkweed or flixweed are the only problems use the 0.223 L/acre rate. MCPA and other brands of 2,4-D are not registered for use on seedling grasses.

Established Forage Crops

Established Alfalfa

Preemergence

Kerb 50-W (50%) Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use only 50 mesh screens. Use the lower rate on grey wooded soils. Do not use on soils with more than 6 per cent organic matter. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass and meadow fescue will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment.

Princep Nine-T (90%) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. See *Forage Crops Chart.* Apply 0.445 kg/acre product in 120 L/acre water in fall (September to November, before freeze-up). Use only 50 mesh nozzles. This treatment will control susceptible plants as they germinate the following spring. Do not apply to alfalfa in the seedling year.

Sinbar (80%) Controls annual grassy and several broadleaf weeds. See *Forage Crops Chart.* Apply 0.283 to 0.61 kg/acre product in 80 L/acre water after alfalfa goes dormant in fall or before new growth begins in spring. Fall application is preferable. Use the lower rate on light textured soils. Do not plant treated areas to any crop within two years as injury may result. Do not apply to alfalfa in the seedling year.

Postemergence

Asulox F (400 g/L) For seed production only. Controls wild oats, suppresses green and yellow foxtail, barnyard grass and several broadleaf weeds. See *Forage Crops Chart.* Apply 1.11 L/acre in 25 to 45 L/acre water when wild oats are in the two to four leaf stage. Do not graze or harvest for livestock feed in the year of treatment.

Asulox F (400 g/L) plus Embutox E (400 g/L) For seed production only. Controls wild oats and several broadleaf weeds and suppresses green and yellow foxtail. See *Forage Crops Chart.* Apply 1.11 L/acre Asulox F tank mixed with Embutox E at 0.61 L/acre in 25 to 45 L/acre water when wild oats are in the two to four leaf stage and before alfalfa reaches 6 inches (15 cm) in height. If alfalfa is under stress when sprayed, bloom may be delayed. Do not graze or harvest for livestock feed in the treatment year.

Carbyne 2EC (240 g/L) Controls wild oats. Apply Carbyne 2EC at 0.61 to 0.71 L/acre in 20 L/acre water. Direct nozzles 45° forward and use a nozzle pressure of 45 psi (300 kPa). When applying with a Spray Coupe, use 50 to 65 psi (350 to 450 kPa) nozzle pressures and ground speeds of 10 to 15 km/h (6 to 9 mph). Apply when the majority of wild oats are in the two leaf stage. Apply when the crop is dry.

Fusilade (250 g/L) Fusilade was available for use in established alfalfa, under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

2,4-D Controls several broadleaf weeds. See *Forage Crops Chart.* Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D immediately after harvest. This treatment may cause crop injury and should be used as a spot treatment only. For product volumes of other 2,4-D formulations, see Table 14.

Established Birdsfoot Trefoil

Preemergence

Kerb 50-W (50%) Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use only 50 mesh screens. Use the lower rate on grey wooded soils. Do not use on soils with more than six per cent organic matter. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass and meadow fescue will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment.

Princep Nine-T (90%), Simadex (80%), Simadex Flowable (500 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. See *Forage Crops Chart.* Apply 0.445 kg/acre product Princep Nine-T or 0.61 kg/acre product Simadex 80W or 0.89 L/acre Simadex Flowable in 120 L/acre water in fall (September to November, prior to freeze-up). Use only 50 mesh nozzles. It may also be used in the seedling year if the stand is well established; at least 5 plants per square foot and 6 inches tall (at least 50 plants/square metre and 15 cm tall).

Do not overlap or treat the same field with Princep Nine-T or Simadex for three consecutive years.

Fusilade (250 g/L) Fusilade was available for use in established birdsfoot trefoil under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986

Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Established Clover

Alsike, Red and Sweet

Postemergence

Carbyne 2EC (240 g/L) Controls wild oats. May be used in alsike, red or sweet clover. Apply Carbyne 2EC at 0.61 to 0.71 L/acre in 20 L/acre water. Direct nozzles 45° forward and use a nozzle pressure of 45 psi (300 kPa). When applying with a Spray Coupe, use 50 to 65 psi (350 to 450 kPa) nozzle pressures and ground speeds of 10 to 15 km/h (6 to 9 mph). Application should be made when the majority of wild oats are in the two leaf stage. Apply when the crop is dry.

Fusilade (250 g/L) Fusilade was available for use in established red clover under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Established Grasses

Postemergence

Banvel (400 g/L) Apply to seed stands of creeping red fescue only. Controls several broadleaf weeds. See *Forage Crops Chart.* Apply 0.236 L/acre in 45 L/acre water. May be tank mixed with 2,4-D amine. Apply up to the early shot blade stage. For dandelion control use Banvel plus 2,4-D amine in the fall when the weed is in the rosette stage.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Carbyne 2EC (240 g/L) Controls wild oats. Apply to **brome and Russian wild rye only**. Apply Carbyne 2EC at 0.61 to 0.71 L/acre in 20 L/acre water. Direct nozzles 45° forward and use a nozzle pressure of 45 psi (300 kPa). Apply when the majority of wild oats are in the two leaf stage and when the crop is dry.

Kerb 50-W (50%) Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use 50 mesh screens. Use the lower rate on grey wooded soils. Do not apply to grasses for seed production or to desired stands of timothy or fescue grass species. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment. Do not use on soils with more than six per cent organic matter.

MCPA or 2,4-D Controls several broadleaf weeds. See *Forage Crops Chart.* Apply 0.51 to 0.91 L/acre of formulations containing 500 g/L 2,4-D or MCPA in 60 L/acre water in early spring before the shot blade stage or after harvest. Where wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are the only problems, use 0.34 L/acre. For product volumes of other 2,4-D or MCPA formulations refer to Table 14.

Pastures and Roadsides

2,4-D is not poisonous to livestock when used as directed. There is a one-day waiting period after the application of 2,4-D before allowing livestock to graze on treated areas.

Certain poisonous plants become more palatable to livestock after being sprayed with 2,4-D. As a result, poisonous plants which normally would be unpalatable, could be eaten following spraying. Information on common poisonous weeds is given in the Special Weed Problems section. In areas not suited to boom equipped ground sprayers, consider aerial spraying or ground sprayers equipped with a cluster nozzle.

Adequate spray volumes (at least 45 L/acre for ground applications unless otherwise stated) are required to minimize drift and to ensure adequate spray coverage. For additional information on brush control see *Non Crop Weed Control* section.

Banvel (480 g/L) plus 2,4-D. Controls top growth of Canada thistle, perennial sow thistle, goldenrod, English daisy, tansy ragwort and curled dock. Apply 0.84 L/acre of Banvel plus 0.89 L/acre of formulations containing 500 g/L of 2,4-D to actively growing weeds. Use 45 to 90 L/acre of water. Retreat as necessary. For product volumes of other 2,4-D formulations refer to Table 14.

For control of goat's beard, ground cherry, pasture sage, and poverty weed use 1.86 L/acre of Banvel in 45 to 90 L/acre water. Application should be made to actively growing weeds.

For control of brush species such as western snowberry (buck brush), wolf willow (silver willow), aspen poplar, wild rose, alder and cherry apply 0.84 L/acre of Banvel plus 1.62 L/acre of 2,4-D amine or 2,4-D LV ester formulations containing 500 g/L to brush when leaves are fully expanded (in spring or early summer). Do not graze dairy cattle for seven days after treatment with the 0.84 L/acre rate of Banvel or for fourteen days following treatment with the 1.86 L/acre rate. If treated vegetation has been consumed by meat animals within 30 days of Banvel application, feed the animals with untreated diet for 30 days before slaughter. Meat animals may graze or feed on treated pasture 30 days after Banvel application without restrictions on slaughter. Do not apply Banvel or any Banvel tank mixes if the stand contains legumes.

Cobutox (400 g/L), Embutox E (400 g/L), 2,4-D Butyric 400 (400 g/L) Controls several broadleaf weeds. See *Forage Crops Chart*. Apply 1.11 to 1.42 L/acre in 60 to 80 L/acre water. Apply before pasture has 3 inches (7.5 cm) of new growth, in the spring or after cutting or grazing. Some height reduction may occur. Treatment will be less effective when applied during cool weather conditions.

To control narrow-leaved hawk's beard seedlings, apply 1.42 L/acre in 60 to 80 L/acre water. Use in the fall after legume growth ceases.

Embutox E see Cobutox.

Kerb 50-W (50%) Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use 50 mesh screens. Use the lower rate on grey-wooded soils. Do not apply to grasses for seed production or to desired stands of timothy or fescue grass species. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment. Do not use on soils with more than six per cent organic matter.

Kil-mor (500 g/L) For use on roadsides only. Controls bull thistle, chicory, goat's-beard, white cockle and several other broadleaf weeds. Apply 1.42 L/acre in sufficient water for good coverage. For best results apply in the spring when plants are actively growing. Do not apply Kil-mor if the stand contains legumes.

Krenite (480 g/L) For use on roadsides only. Controls maple, oak, common alder, hazel, ash, elm, poplar, willow, birch, aspen, pine and balsam fir. Apply 10 to 15 L per 1000 L water. Add 1 to 2 L Surfactant WK, Tween 20 or Triton X-100 to the mixture. Apply at high pressure in 200 to 1200 L/acre of spray (volume depends on height, density and type of brush) and spray to wet. Apply from mid-June to late September. Results of this treatment are often delayed, so plants will remain green for most of the season after treatment. Susceptible plants will fail to leaf out the spring following treatment. This treatment is useful where immediate foliage browning is undesirable.

Tordon 22K (240 g/L) Controls perennial thistles and leafy spurge. To control perennial thistles apply at 1.82 L/acre in 160 L/acre water from the rosette stage in the spring through flowering but before the first heavy frost in the fall. To control leafy spurge apply at 3.64 L/acre in 160 L/acre water before the plants set seed.

NOTE: *Tordon 22K is registered for the control of biennial and deep-rooted perennial broadleaf weeds on rangeland and permanent grass pastures when* ***applied under the direction of an authorised applicator****. Directions for use and precautions must be followed carefully. Do not apply Tordon 22K if the stand contains legumes.*

Tordon 101 Mixture (300 g/L) For use on roadsides only. Controls alder, birch, cedar, maple, pine, poplar, spruce, hazel, elm, willow, aspen, balsam fir. Apply 7.28 to 10.1 L/acre in 80 L/acre water up to three weeks before the first killing frost. Controls Canada thistle, sweet and red clover, wild carrot, common ragweed, dandelion, goldenrod, dock, plantain, prickly lettuce, burdock, fleabane and vetch. Apply 2.83 L/acre in 80 L/acre water in the spring or early summer after growth begins.

NOTE: ***Applications of Tordon 101 Mixture must be made by authorized applicators.*** *Do not apply Tordon 101 Mixtures if the stand contains legumes.*

2,4-D Controls absinthe, pasture sage, biennial wormwood, prairie sage, prairie everlasting (pussy toes) and leafy spurge. Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water in early fall and repeat in spring when weed is growing in competition with grass. For product volumes of other 2,4-D formulations see Table 14. Re-treat as required. At least two treatments will be required during the season. 2,4-D also controls perennial thistles when applied before flowering in early June. Re-treat as necessary.

To control gumweed, goat's beard, cocklebur and common burdock, apply 0.91 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water in June or early July. For product volumes of other 2,4-D formulations see Table 14.

To control western snowberry (buckbrush), willows, wolf willow and scrub poplar, apply 1.82 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in not less than 80 L/acre water. Apply at full leaf stage when plants are actively growing, usually in June and early July. Re-treatment may be necessary the following year. For product volumes of other 2,4-D formulations see Table 14.

2,4-D LV ester (aerial application) Controls western snowberry (buckbrush), willows, wolf willow and scrub poplar. Apply 1.82 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in 12 to 24 L/acre oil. Apply when plants are actively growing usually in June or early July. Treatment may be necessary the following year. For product volumes of other 2,4-D formulations, see Table 14.

2,4-D Butyric 400 see Cobutox.

For total vegetation control along roadsides see the *Vegetation management* section. For spot treatment of special weed problems review the *Special Weed Problems* section.

Pasture renovation

Certain products can be used to control or suppress existing vegetation for minimum tillage seeding of forages into established sod for renovating pastures.

Gramoxone (200 g/L) Controls annual broadleaf and grassy weeds. Apply 1.11 to 2.23 L/acre in 120 to 200 L/acre water in May after 2 to 4 inches (5 to 10 cm) of new growth has appeared. To control perennial broadleaf weeds apply 2,4-D or a 2,4-D based treatment in August prior to Gramoxone treatment.

Roundup (356 g/L) Controls annual broadleaf and grassy weeds. Apply 0.91 to 1.42 L/acre in 45 to 120 L/acre water. Use on existing vegetation immediately before, during or after zero-till seeding of forages into the established sod. For best results apply when plants are actively growing or well established so sufficient movement of the chemical will occur into the root system of to give effective control. Spray coverage should be uniform and complete. Do not spray to runoff.

Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness. For control of perennial weed problems see the section on *Special Weed Problems.*

Horticulture Crops

TABLE 11. HERBICIDES FOR HORTICULTURE CROPS

CROPS HERBICIDES	Asparagus	Beans, Lima	Beans, Snap	Beets	Broccoli, Brussel Sprouts	Cabbage, Cauliflower	Carrots	Celery	Corn, Sweet	Cucumbers	Onions	Parsnips	Peppers	Potatoes	Rutabagas	Tomatoes	Raspberries	Strawberries	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Wild Oats	Quack Grass	Bindweed, Field	Blue Bur	Buckwheat, Tartary	Buckwheat, Wild	Catchfly, Night Flowering	Chickweed	Cockle, Cow	Cocklebur
Afolan F Lorox L	X						X	X[1]				X[1]							●	S	S						●		●		
Agricultural Weedkiller No. 1							X					X							●	●	●	●									
Alanap 3 + Prefar										X									●	●	●			●					●		●
Amitrol T	X																						●								
Basfapon Dalapon Dowpon Dowpon M	X													X			X			●	●										
Basagran		X	X						X															●					●		●
Buctril M									X																●	●	●			●	●
Casoron 4G																	X			●	●								●		
CIPC + Randox											X								●	●	●								●		
Dual									X										●	●	●										
Dyanap										X									●	●	●										
Enide																		X	●	●	●										
Eptam			X											X	X				●	●	●	●	S						●		
Eptam + Sencor or Lexone														X					●	●	●	●	S			●			●		
Eradicane 8-E									X										●	●	●	●	S						●		
Goal[4]											X[4]																●				
Gramoxone-stale seedbed		X	X	X	X	X	X		X	X	X			X	X				CONTROLS												
Gramoxone-pre to crop	X													X			X[3]		CONTROLS												
Hoe-Grass 284											X[4]			X					●	●	●	●									
Karmex	X																			●											
Kil-Mor									X															□	O	●	●	O		●	●
Pardner Torch DS									X																	●	●			●	
Prefar										X									●	●	●										
Primextra[5]									X										●	●	●						●				
Princep Nine-T Simadex Simadex 80 W	X																X		●			●			●		●	●	●		
Randox											X								●	●	●										
Rival Treflan EC		X	X		X	X	X						X		X	X			●	●	●	●					●		●	●	
Ro-Neet 7.2 E				X															●	●	●	●									
Roundup-pre to crop														X					CONTROLS												
Sencor, Lexone														X												●			●		
Sinbar																		X	●	●	●	●			●		●	●	●		
Sinox PE		X	X																												
Sutan +									X										●	●	●										
TCA				X																●	●										
Tenoran																		X											●		●
Totril											X																●		●		
2,4-D	X								X								X							□	●						●

WEEDS																															
Flixweed	Goosefoot, Oak-leaved	Groundsel	Hemp nettle	Knotweed, Prostrate	Kochia	Lamb's-quarters	Lettuce, Prickly	Mustard, Ball	Mustard, Dog	Mustard, Hare's-ear	Mustard, Indian	Mustard, Tumble	Mustard, Wild	Mustard, Wormseed	Pigweed, Prostrate	Pigweed, Red Root	Pigweed, Russian	Pigweed, Tumble	Purslane	Ragweed, Common	Ragweed, False	Ragweed, Giant	Russian-thistle	Shepherd's Purse	Annual Smartweed Species: Lady's Thumb	Sow Thistle (Annual)	Sow Thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Corn	Volunteer Rapeseed
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LEGEND:

HERBICIDES AND CROPS

X Recommended on crop.

[1] Afolan only.

[3] Apply as directed spray.

[4] Dry bulb onion only.

[5] These treatments may remain as a residue in the soil the following year. Flax, peas, triazine tolerant canola and fababeans are more tolerant crops. See comments in corn section for specific instructions.

LEGEND: WEEDS

● Controlled by maximum rates recommended for crops. Where two brand names are recommended, the weed may not appear on both labels.

S Suppression.

O Not labelled for control but adequate control can be expected.

□ Top growth control only.

‡ Controlled by rates less than the maximum recommended for crops.

[a] Split application required for adequate control.

[b] Regrowth can be expected.

Vegetables

Stale Seedbed

Crops

Beans (all types), beets, brussel sprouts, carrots, cabbage, cauliflower, corn, cucumber, kale, onion, peas, potatoes, rutabagas.

Method

Prepare seedbed two to four weeks before seeding to stimulate weed growth. Seed without further cultivation and with minimum disturbance of the soil. Emerged weeds must be burned off with Gramoxone either before or shortly after seeding, but no later than three days before the crop will emerge.

Gramoxone (200 g/L) Controls annual grasses and broadleaf weeds and top growth of perennial weeds. Apply 1.12 to 2.22 L/acre in 120 to 445 L/acre clean water preemergent to the crop, postemergent to the weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height, and the higher volume of water on dense weed growth.

Asparagus

Established stands only.
Before spear emergence or after last cutting.

Afolan F (450 g/L), Lorox L (480 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply Afolan F at 1.49 to 2.02 L/acre in 90 to 135 L/acre water or Lorox L at 1.82 L/acre in 120 L/acre water. Treatment may be repeated after last cutting.

Amitrol-T (200 g/L) Controls perennial grasses and thistles. (Table 11) Apply 8.9 L/acre in 80 to 200 L/acre water after last cutting.

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%) Controls barnyard grass, green and yellow foxtail. Apply Basfapon or Dalapon at 1.31 to 2.73 kg/acre product or Dowpon or Dowpon M at 1.37 to 2.75 kg/acre product in 80 L/acre water. Apply after cutting before grasses are at the four leaf stage.

To control quackgrass in established asparagus apply Dalapon, Dowpon or Dowpon M at 4.45 kg/acre product before cutting and again about three to four weeks later as needed. For a single treatment apply Dalapon at 9.1 kg/acre product or Dowpon or Dowpon M at 8.9 kg/acre product before or after the cutting season.

Apply Basfapon at 5.86 to 9.1 kg/acre product in 80 to 160 L/acre water after cutting at one week before close of the cutting season, or in October after fern removal. Disc the field after last cutting. Do not make more than one application of Basfapon per season.

Dalapon see Basfapon.

Dowpon, Dowpon M see Basfapon.

Gramoxone (200 g/L) Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 1.11 to 2.22 L/acre in 120 to 445 L/acre clean water to emerged weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height, and the higher volume of water on dense weed growth. Do not apply to emerged spears which are to be used for human consumption.

Karmex (80%) Controls several grass and broadleaf weeds. (Table 11). Apply as a band or broadcast treatment. On light sandy soils or other soils low in clay or organic matter apply Karmex at 0.44 to 0.91 kg/acre product in 100 to 160 L/acre water. On soils high in clay or organic matter, use 0.91 to 1.82 kg/acre product in 100 to 160 L/acre water.

Two applications may be used; the first application should be made before weeds become established, but no earlier than four weeks before spear emergence and no later than early cutting period (if weeds are controlled into the cutting period by cultural practices, application may be delayed until immediately after the last cultivation); a second application may be made immediately following completion of harvest provided rainfall is expected. When two applications are used in one season, do not exceed 1.31 kg/acre per application. If irrigation is used, apply only a single treatment of 1.82 kg/acre in late September or October.

Well established weeds should be eliminated by mechanical or other means. For best results, the soil should be well prepared and as free as possible from trash and clods.

Sufficient moisture in the form of rainfall or irrigation is necessary after treatment to carry the chemical into the root zone of germinating weeds.

Note: Spray booms must be shut off while starting, turning, slowing, or stopping or crop injury will occur. The soil surface should not be cultivated or disturbed after application as weed control may be reduced and/or crop injury may result. **Do not replant treated areas to any crop within two years after last application as injury to subsequent crops may result.** Do not use on soils with less than 1 per cent organic matter content.

Lorox L see Afolan F

Princep Nine-T (90%), Simadex (500 g/L), Simadex 80 W (80%) Controls barnyard grass, wild oats and several broadleaf weeds. (Table 11) Apply Princep Nine-T at 1.01 to 1.52 kg/acre product in 120 L/acre water, Simadex at 1.82 to 2.71 L/acre in 120 L/acre water or Simadex 80 W at 1.11 to 1.72 kg/acre product in 140 L/acre water after discing in spring prior to weed and spear emergence and at least seven days before first cutting. A second application may be made after harvest completion if weeds are removed. Do not apply during cutting season.

Simadex, Simadex 80 W see Princep Nine-T.

2,4-D amine Controls perennial thistles. Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D in 45

L/acre water. Product volumes of other 2,4-D formulations are given in Table 14. Apply after last cutting.

Beans
(Snap and Lima)

Stale Seedbed

See the *Stale Seedbed Weed Control* at beginning of Horticulture Section.

Preplant Incorporated

Eptam 8-E (800 g/L), Eptam 10G (10%) Snap beans only. Controls annual grasses and several broadleaf weeds. (Table 11) Spring application only. Apply 1.71 to 2.22 L/acre or 13.75 to 18.21 kg/acre product. Apply liquid in at least 45 L/acre water. The granular product should be applied with a suitable granular applicator. Eptam must be applied to a dry soil surface of a well prepared seedbed. Incorporate immediately according to instructions in *Herbicide Incorporation* section.

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail and several broadleaf weeds. (Table 11). For snap beans apply 0.65 to 1.13 L/acre of Rival or 0.60 to 0.80 L/acre of Treflan EC as a spring preplant application in at least 45 L/acre water. For lima beans, apply 0.65 to 1.13 L/acre of Rival or 0.405 to 0.61 L/acre of Treflan EC. See the *Herbicide Incorporation* section for application and incorporation instructions.

Preemergence

Sinox PE (360 g/L) Controls several broadleaf weeds (Table 11). Apply Sinox PE at 6.88 to 8.9 L/acre in 100 to 160 L/acre water at time of or shortly after planting. Do not apply on light sandy soil containing little or no organic matter.

CAUTION: *Use rubber gloves, goggles, and agricultural respirator when handling Sinox PE.*

Postemergence

Basagran (480 g/L) Controls several annual broadleaf weeds. (Table 11) Apply 0.7 to 0.91 L/acre in 80 to 160 L/acre water after first trifoliolate leaf stage. Add Citowett Plus at 2.5 L/1000 L of spray mixture or Assist oil concentrate 5 to 10 L/1000 L of spray mixture to improve weed control.

Controls Canada thistle and field bindweed with split application of 0.71 L/acre plus 0.71 L/acre applied seven to ten days later in 80 to 160 L/acre water. For Canada thistle control only, add Citowett Plus at 2.5 L/1000 L of spray mixture or Assist oil concentrate at 5 to 10 L/1000 L of spray mixture when thistles are 6 to 8 inches (15 to 20 cm) tall. Apply when field bindweed has developed a dark green colour and before it has begun trailing.

Cool weather or drought will delay herbicidal activity and if prolonged, may result in poor weed control. Use of Basagran in hot, humid weather may result in temporary leaf yellowing, leaf flecking, bronzing or burning. Crop usually out grows this condition within 10 days.

Sinox PE (360 g/L) Controls several broadleaf weeds. (Table 11) Apply Sinox PE at 3.44 to 5.66 L/acre in 100 to 160 L/acre water when beans are in, but not beyond the crook stage. Do not use these products on light sandy soil containing little or no organic matter.

Apply when crop foliage is dry. Leaf burn may occur. Spraying is more effective and less product is required at moderately high temperatures of 21° to 30°C (70 to 86°F). However, to avoid crop damage, do not spray when temperatures exceed 30°C (86°F) or are expected to exceed 30°C (86°F) within 24 hours after application. Below 21°C (70°F) use the higher rates. Since this product acts by contact action only, ensure that the spraying system gives uniform coverage of all weed foliage.

CAUTION: *Use rubber gloves, goggles, and agricultural respirator when handling Sinox PE.*

Beets (Red)

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Ro-Neet 7.2 E (720 g/L) Controls annual grasses and several broadleaf weeds. (Table 11) Apply 1.92 to 2.53 L/acre in 80 to 160 L/acre water. Immediately after application, thoroughly incorporate to a depth of 2 to 3 inches (5 to 7 cm) taking care to minimize loss of seedbed moisture.

Preemergence

Bar-fox (83%), NaTA TCA (83%) Controls green and yellow foxtail. Apply 2.49 to 3.99 kg/acre product NaTA TCA or 2.73 to 4.05 kg/acre product Bar-fox in 45 L/acre water before the beets emerge. Do not feed tops to livestock.

Broccoli, Brussel Sprouts, Cabbage, Cauliflower
Direct seeded or transplant

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail and several broadleaf weeds. (Table

11) For spring application only. Apply 0.65 to 1.13 L/acre of Rival or 0.60 to 0.80 L/acre of Treflan EC in at least 45 L/acre water. See *Herbicide Incorporation* section for application and incorporation instructions.

Carrots

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail and several broadleaf weeds. (Table 11) For spring application only. Apply 0.65 to 1.13 L/acre of Rival or 0.60 to 0.80 L/acre of Treflan EC in at least 45 L/acre water. See *Herbicide Incorporation* section for application and incorporation instructions.

Postemergence

Afolan F (450 g/L), Lorox L (480 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply Afolan F at 0.77 to 2.02 L/acre or Lorox L at 0.91 to 1.82 L/acre in 90 to 130 L/acre water.

Do not apply with greater than 40 psi (275 kPa) pressure. Spray when carrots have two or more fully developed leaves. Use lower rates on small seedling weeds and higher rates on larger established weeds. Apply before annual grasses exceed 2 inches (5 cm) in height or before broadleaf weeds exceed 6 inches (15 cm). During hot, dry weather spray in the cool part of the day to avoid injury.

Agricultural Weedkiller No. 1 (100%) Controls barnyard grass and several broadleaf weeds. (Table 11) Apply 240 to 320 L/acre as an overall treatment when carrots are in the two to four leaf stage and before weeds are 4 inches (10 cm) tall. Spray in evening when humidity is high and winds are light.

CAUTION: *Do not mix Agricultural Weedkiller No. 1 with other herbicides.*

1. *If Afolan F or Lorox L is applied first, wait 24 hours before applying Agricultural Weedkiller No. 1*
2. *If Agricultural Weedkiller No. 1 is applied first, wait at least two weeks before applying Afolan F or Lorox L.*

Lorox L see Afolan F.

Celery

Postemergent to weeds, 8 to 10 days after transplanting and new growth has started.

Afolan F (450 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply 0.77 to 2.02 L/acre in 90 to 135 L/acre water. Do not apply under hot conditions.

Corn (Sweet)

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Dual (960 g/L) Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre water. Use the higher rate for heavy weed infestations. Incorporate in the top 2 inches (5 cm) of soil with a tandem disc, vibrating shank cultivator or harrows set to work the soil no deeper than 4 inches (10 cm). Immediate incorporation is not required. Do not use on peat or muck soils. Heavy rainfall conditions following application of Dual may result in reduced weed control, especially on sandier soil types. Dual may be tank mixed with Aatrex or Atrazine. See *Herbicide Incorporation* section for incorporation instructions.

Eradicane 8-E (800 g/L) Controls several grasses and broadleaf weeds. (Table 11) Apply at 1.72 to 2.23 L/acre in at least 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Plant seed to a maximum depth of 2 inches (5 cm). See *Herbicide Incorporation* section for information on incorporation.

CAUTION: *The level of weed control may be reduced when Eradicane is used on soils which have been treated with Eradicane or Eptam the previous growing season. It is anticipated that the reduction in control will be greater where Eradicane or Eptam has been used repeatedly for two or more years.*

Lasso (480 g/L) Lasso was available for use in sweet corn under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review due to health concerns. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available in March 1986) or consult your Ag Rep, Weed Supervisor or Monsanto representative.

Primextra (500 g/L) Controls green and yellow foxtail, barnyard grass and several broadleaf weeds. (Table 11) Apply 2.71 to 3.44 L/acre in a minimum of 60 L/acre water. Use the higher rate when heavy weed infestations are expected. Incorporate thoroughly into the top 2 inches (5 cm) of soil prior to planting. Immediate incorporation is not necessary. Heavy rainfall conditions following application of Primextra may result in reduced weed control, especially on sandier soil types. See *Herbicide Incorporation* section for incorporation instructions. This treatment may leave a residue in the soil the following year. See caution under Sutan+ and Atrazine.

Sutan+ (800 g/L) Controls green and yellow foxtail and barnyard grass. Apply 1.72 to 2.23 L/acre in a minimum of 45 L/acre water to a dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Do not seed deeper than 2 inches (5 cm). See *Herbicide Incorporation* section for incorporation instructions. Follow Sutan+ application with a recommended postemergence herbicide to control broadleaf weeds if necessary.

CAUTION: *The level of weed control will be reduced where Sutan is used on soils which have been treated with Eradicane or Eptam or Sutan+ the previous growing season. It is anticipated that the reduction in control will be greater where Eradicane, Eptam or Sutan+ has been used repeatedly for two or more years.*

Postemergence

For corn less than 6 inches (15 cm) tall (leaf outstretched) the following treatments may be applied as an overall spray.

Basagran (480 g/L) Controls several broadleaf weeds. (Table 11) Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. Add Citowett Plus at 2.5 L/1000 L spray mixture or Assist oil concentrate at 5 to 10 L/1000 L of spray mixture to improve the control of advanced weeds.

Basagran also controls top growth of Canada thistle and field bindweed (patch treatment). Apply a split application of 0.71 L/acre plus 0.71 L/acre seven to ten days later. Apply in 80 to 160 L/acre water, when thistles are 6 to 8 inches (15 to 20 cm) tall and when field bindweed has developed a dark green color and before it has begun trailing. Add Citowett Plus at 2.5 L/1000 L spray mixture or Assist Oil concentrate at 5 to 10 L/1000 L of spray mixture.

Best results are obtained when Basagran is applied under higher temperatures 21°C (70°F). Cool weather or drought will delay herbicidal activity and if prolonged, may result in poor weed control. Use of Basagran in hot, humid weather may result in temporary leaf yellowing, leaf flecking, bronzing or burning. Crop usually out grows this condition within 10 days.

Buctril M (560 g/L) Controls several broadleaf weeds (Table 11). Apply 0.405 L/acre in 80 to 120 L/acre water at a pressure of 40 psi (275 kPa) when corn is in the four to six leaf stage and weed seedlings are small. Leaf scorch may occur if application is made under hot, humid conditions.

Kil-mor (500 g/L) Controls several broadleaf weeds. (Table 11) Apply 0.343 to 0.445 L/acre in a minimum of 45 L/acre water as an overall spray. For corn over 6 inches (15 cm) tall see directed postemergence recommendation in this section.

2,4-D amine Controls several broadleaf weeds. (Table 11) Apply 0.339 to 0.45 L/acre of formulations containing 500 g/L 2,4-D amine in 45 L/acre water as an overall spray until corn is 6 inches (15 cm) tall (leaf outstretched), after which a directed spray should be used. See directed postemergence recommendations in this section. For product volumes of other formulations of 2,4-D amine see Table 14.

For corn over 6 inches (15 cm) tall the following treatments may be applied as an overall spray.

Pardner (280 g/L) Controls several broadleaf weeds. (Table 11) Apply 0.405 to 0.485 L/acre in at least 80 L/acre water. Apply when corn is in the four to eight leaf stage and before the weeds are past the four leaf stage. Do not use under conditions of high humidity and high temperature (greater than 30°C) or crop injury may occur.

CAUTION: *Pardner is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Torch DS (450 g/L) Controls several broadleaf weeds. See Table 11. Apply 0.252 to 0.354 L/acre Torch DS in at least 65 L/acre water. Apply before weeds are past the four leaf stage and before corn is 10 inches (25 cm) high. Do not apply under conditions of high humidity and high temperature (greater than 30°C, 86°F) or crop injury may occur.

Directed Postemergence

For corn over 6 inches (15 cm) tall (leaf outstretched). Application of these herbicides requires positioning of the nozzles to direct spray to the base of the corn plant. Severe damage is likely if the crop leaves are sprayed.

Kil-mor (500 g/L) Controls several broadleaf weeds. (Table 11) Apply 0.343 to 0.445 L/acre in a minimum of 45 L/acre water.

2,4-D amine Controls several broadleaf weeds. (Table 11) Apply 0.687 L/acre of formulations containing 500 g/L 2,4-D amine in 45 to 90 L/acre water according to the species and stage of weeds present. For product volumes of other formulations of 2,4-D amine, see Table 14.

Cucumbers

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Alanap 3 (240 g/L) plus Prefar (480 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply 3.84 to 5.67 L/acre Prefar plus 3.84 to 7.69 L/acre Alanap 3. Apply as a tank mix in 45 to 160 L/acre water. Incorporate lightly 0.4 to 1.2 inches (1 to 3 cm). Use lower rate on light sandy soils. See caution regarding residue under Prefar recommendation.

Prefar (480 g/L) Controls barnyard grass, green and yellow foxtail. Apply 4.86 to 5.67 L/acre in 45 to 200 L/acre water. Incorporate 1 to 2 inches (2.5 to 5 cm).

CAUTION: *Do not apply Prefar more often than once every 12 months. To avoid crop injury rotate only to cucumbers, peppers, cole crops, carrots, lettuce or tomatoes.*

Preemergence

Dyanap (330 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply 5.67 to 6.88 L/acre in 80 to 160 L/acre water. Thorough and uniform coverage of the surface is essential for good weed control. If soil is cold at time of seeding delay Dyanap application until soil temperature warms up. Do not apply after crop has emerged.

Onions

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preemergence

CIPC (480 g/L) plus Randox (480 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply 3.79 L/acre CIPC plus 3.84 L/acre Randox in 90 L/acre water. Apply before weeds germinate and before onions have reached the loop stage. Rain or irrigation of at least 0.5 inch (1.25 cm) is required immediately after application for satisfactory results. Randox is recommended for use on soils high in organic matter or clay. It is less effective on sandy soils that are low in organic matter or clay.

NOTE: Registration of Randox may not be continued for 1986. Consult Manitoba Agriculture regarding availability and permit requirements.

Goal (192 g/L) Controls several broadleaf weeds (Table 11). Use in dry bulb onions only. Apply 0.253 L/acre in at least 200 L/acre water at a nozzle pressure of 275 kPa. Apply when the weeds are in the two to four leaf stage and actively growing. The first application can be made when the onions have two fully developed true leaves. More than one application may be necessary to control later germinating weeds. Do not apply in excess of 1.01 L/acre in one year. Do not apply Goal when the crop or weeds are under stress from excess or lack of moisture, extreme temperatures or injury from a previously applied herbicide. Do not apply within 56 days of harvest. Do not apply preemergent or prior to the two leaf stage or severe injury to the onions may occur.

Note: Registration of Goal may not be continued for 1986. Consult Manitoba Agriculture regarding availability and use permit requirement.

Randox (480 g/L) Controls barnyard grass, green and yellow foxtail and broadleaf weeds. (Table 11) Apply 5.67 L/acre immediately after planting or if heavy rain is expected just before crop emergence.

On sets or transplant onions, apply 5.67 L/acre as a directed spray (overall sprays may cause tip burn during hot weather) soon after planting.

For a delayed or second application, apply 5.67 L/acre as a directed spray when the onions (except green onions) have developed three true leaves. Do not use within 45 days of harvest. Randox is recommended for use on soils high in organic matter or clay. It is less effective on sandy soils that are low in organic matter or clay.

NOTE: Registration of Randox may not be continued for 1986. Consult Manitoba Agriculture regarding availability and permit requirements.

Postemergence

Hoe-Grass 284 (284 g/L) Dry bulb onion only. Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.41 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when the weeds are in the one to four leaf stage, and before they tiller. Other postemergence herbicides must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

Totril (225 g/L) Controls several broadleaf weeds. (Table 11) Apply 0.809 L/acre in 160 L/acre water. Apply when weeds are in the seedling stage and after the crop is in the three leaf stage. Applications may be repeated after 14 days for late emerging weeds.

Parsnips

Postemergence

Afolan F (450 g/L) Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 11) Apply 0.77 to 2.02 L/acre in 90 to 135 L/acre water. Do not apply with pressure greater than 40 psi (275 kPa). Spray when parsnips have two or more fully developed leaves. Use lower rates on small seedling weeds and the higher rates on larger established weeds. Apply before annual grasses exceed 2 inches (5 cm) in height and before broadleaves exceed 6 inches (15 cm). During hot, dry weather spray in the cool part of the day to avoid injury.

Agricultural Weedkiller No. 1 (100%) Controls barnyard grass and several broadleaf weeds. (Table 11) Apply 240 to 320 L/acre as an overall treatment when crop is in the two to four leaf stage and before weeds are 4 inches (10 cm) tall. Spray in evening when humidity is high and the winds are light.

CAUTION: *Do not mix Agricultural Weedkiller No. 1 with other herbicides.*

1. *If Afolan F is applied, wait 24 hours before applying Agricultural Weedkiller No. 1.*
2. *If Agricultural Weedkiller No. 1 is applied first, wait at least two weeks before applying Afolan F.*

Peppers

Preplant Incorporated

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail, wild oats and several broadleaf weeds. (Table 11) Spring application only. Apply 0.65 to 1.13 L/acre Rival or 0.61 to 0.81 L/acre Treflan EC in at least 45 L/acre water. See *Herbicide Incorporation* section for application and incorporation instructions.

Potatoes

Timely tillage with harrows, mulchers and cultivators supplemented with chemical weed control can be used to effectively control most weeds in potatoes. Timing of operations and chemical control measures must be selected for specific field conditions and weed problems.

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated

Eptam 8-E (800 g/L) Eptam 10 G (10%) Controls several annual grasses and broadleaf weeds. (Table 11)

Spring application

Apply 1.72 to 2.23 L/acre liquid or 13.8 to 18.2 kg/acre granular product. Apply liquid in at least 45 L/acre water. The granular product should be applied with a suitable granular applicator. Eptam must be applied to a dry soil surface of a well prepared seedbed. Incorporate immediately according to instructions in the *Herbicide Incorporation* section.

Fall application

Although registered for fall application, the application and incorporation requirements for Eptam predispose soils to erosion and use is not recommended.

Quack grass control

Spring application. Apply 2.83 to 3.44 L/acre liquid or 22.7 to 27.1 kg/acre granular product. Apply liquid in at least 45 L/acre water. Spray or broadcast on a dry soil surface. Incorporate immediately according to instructions in *Herbicide Incorporation* section. Quackgrass must be cut up so that remaining rhizomes have four or less nodes prior to application.

Eptam 8-E may be applied with liquid fertilizer, or on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

CAUTION: *The level of weed control will be reduced where Eptam is used on soils which have been treated with Eradicane, Eptam or Sutan the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

Eptam 8-E (800 g/L) plus Sencor 500 (500 g/L) or Sencor 75 DF (75%) Controls annual grasses and several broadleaf weeds. See Table 11. Apply a tank mix of 0.222 to 0.343 L/acre Sencor 500 or 0.151 to 0.222 kg/acre Sencor 75 DF plus 1.70 to 2.23 L/acre Eptam 8-E. Do not use on varieties Belleisle, Tobique and Shepody or on soil with greater than seven per cent organic matter or less than two per cent organic matter. Refer to *Herbicide Incorporation* section for incorporation instructions.

CAUTION: *Fall seeded cover crops such as wheat, oats and rye may be injured when seeded the same season as application of Lexone or Sencor. Rapeseed, (except triazine tolerant Canola), sunflowers, sugar beets and several horticulture crops may be sensitive to Lexone or Sencor residue the year following application. After harvest tillage practices that provide thorough mixing of the soil may be helpful in reducing the chance of injury to succeeding crops. The level of weed control will be reduced where Eptam is used on soils which have been treated with Eradicane, Eptam or Sutan the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

Preemergence

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%) Controls barnyard grass, green and yellow foxtail. Apply Basfapon at 2.23 to 3.14 kg/acre product in 80 to 160 L/acre water, Dalapon at 1.32 to 2.73 kg/acre product in at least 90 L/acre water, or Dowpon or Dowpon M at 1.38 to 2.75 kg/acre product in at least 90 L/acre water. Do not apply after potatoes emerge and do not use on red skinned varieties.

Dalapon see Basfapon.

Dowpon, Dowpon M see Basfapon.

Eptam 8-E (800 g/L) - drag-off Controls several annual grasses and broadleaf weeds. (Table 11) Apply 1.72 to 3.44 L/acre. The field must first be "dragged-off", followed by Eptam 8-E application and incorporation. Use spike toothed harrows or cultivation equipment for incorporation. Refer to *Herbicide Incor-*

poration section for further incorporation and rate instructions.

Gramoxone (200 g/L) Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 1.11 to 2.22 L/acre in 120 to 445 L/acre clean water to emerged weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height and the higher volume of water on dense weed growth. Do not apply if more than 30 per cent of the potatoes have emerged. Do not apply to emerged plants in the evening, under cloudy conditions, or when plants are under moisture stress. Potatoes grown for early harvest should not be treated after emergence.

Roundup (356 g/L) Controls annual weeds. Apply 0.91 L/acre in at least 45 L/acre water to actively growing grasses and broadleaf weeds less than 6 inches (15 cm) tall. If weeds are over 6 inches (15 cm) tall apply 1.42 L/acre. Apply to emerged weeds before or after planting, but before potatoes show above ground. Do not apply after potato emergence as Roundup will kill all green vegetation. Allow at least three days after treatment before disturbing the soil.

Controls perennial weeds. Refer to the *Perennial Weed Control on Cropland* section and the *Special Weed Problems* section for information on growth stages and rates of application.

Postemergence

Eptam 8-E (800 g/L) Sprinkler Irrigation Controls annual grasses and several broadleaf weeds. (Table 11) Meter 1.72 to 2.22 L/acre into first irrigation water following a clean cultivation. Do not apply within 45 days of harvest.

Fusilade (250 g/L) Fusilade was available for use in potatoes under a temporary registration granted by Agriculture Canada in 1985. At the time of printing, this registration was under review. For revised information concerning availability, application instructions, safety considerations and use precautions, see the 1986 Addendum to this Guide (available April 1986), or consult your Ag Rep, Weed Supervisor or Chipman representative.

Hoe-Grass 284 (284 g/L) Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when weeds are in the one to four leaf stage, and before they tiller. Other postemergent herbicides must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

Lexone DF (75%) Lexone L (480 g/L) For use on irrigated potatoes only. Controls several broadleaf weeds. See Table 11. Apply 0.222 L/acre Lexone L or 0.141 kg/acre Lexone DF in 45 to 120 L/acre water. Apply early postemergence soon after potatoes emerge and before weeds are 1.6 inches (4 cm) high. Do not use on red-skinned, Shepody, Belleisle or Tobique or any early maturing varieties. Do not apply within 60 days of harvest.

Sencor 500 (500 g/L), Sencor 75 DF (75%) Controls several broadleaf weeds. See Table 11. Apply 0.222 L/acre Sencor 500 or 0.151 kg/acre Sencor 75 DF in 45 to 120 L/acre water. Apply early postemergence soon after potatoes emerge and before weeds are 1.6 inches (4 cm) high. Do not use on the varieties Shepody, Belleisle and Tobique. Do not use postemergence treatments on red skinned or on early maturing varieties. Do not apply within 60 days of harvest.

Rutabagas

Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

Preplant Incorporated
(6 to 10 days Before Planting)

Eptam 8-E (800 g/L), Eptam 10 G (10%) Controls annual grasses and several broadleaf weeds. (Table 11) Apply 1.32 to 1.72 L/acre or 9.1 to 13.8 kg/acre granular product. Apply liquid in at least 45 L/acre water. The granular product should be applied using a suitable granular applicator. Eptam must be applied to a dry soil surface of a well prepared seedbed. See *Herbicide Incorporation* section for information on incorporation.

CAUTION: *If dry weather prevails at the time of application, do not use Eptam on sand and use the lower rate on medium and heavy soils.*

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail, wild oats, and several broadleaf weeds. (Table 11) Spring application only. Apply 0.65 to 1.13 L/acre Rival or 0.61 to 0.81 L/acre Treflan EC in at least 45 L/acre water. Refer to *Herbicide Incorporation* section for application and incorporation instructions.

Tomatoes (Transplanted)

Preplant Incorporated

Rival (500 g/L), Treflan EC (545 g/L) Controls green and yellow foxtail, wild oats, and several broadleaf weeds. (Table 11) Spring application only. Apply 0.65 to 1.13 L/acre Rival or 0.61 to 0.81 L/acre Treflan EC in at least 45 L/acre water. Refer to *Herbicide Incorporation* section for application and incorporation instructions.

Fruits

Raspberries

NOTE: *The following treatments are recommended as directed sprays to established plantings only.*

Preemergent to Weeds

Casoron 4G (4%) Controls annual and perennial grasses and broadleaf weeds. (Table 11) Apply 44.5 to 70.8 kg/acre product in the fall. Use the lower rate on lighter soils. Avoid use on light sandy soil. Use the lower rate if treatment is followed by rain or irrigation. Do not apply in spring as injury can occur. Do not cultivate or work into soil.

Princep Nine-T (90%), Simadex (500 g/L), Simadex 80 W (80%) Controls annual grasses and several broadleaf weeds. (Table 11) Apply 0.81 to 1.01 kg/acre product Princep Nine-T, 1.46 to 1.82 L/acre Simadex or 0.91 to 1.11 kg/acre product Simadex 80 W in 120 L/acre water at base of canes in early spring. Do not spray young shoots. Avoid excessive wetting of raspberries.

Simadex, Simadex 80 W see Princep Nine-T.

Postemergent to Weeds

Basfapon (74%), Dalapon (74%), Dowpon (74%), Dowpon M (74%) Controls barnyard grass, green and yellow foxtail. Apply 1.32 kg/acre product of Basfapon or 0.405 to 1.32 kg/acre product of Dalapon, Dowpon or Dowpon M. Apply Dalapon in a minimum of 60 L/acre water. Apply Basfapon, Dowpon or Dowpon M in a minimum of 70 L/acre water. Apply Basfapon in fall only. Do not apply Dowpon or Dowpon M within 30 days of harvest. Avoid spraying raspberry foliage and young canes. Wet grass thoroughly.

Dalapon see Basfapon.

Dowpon, Dowpon M see Basfapon.

Gramoxone (200 g/L) Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 2.2 L/acre in 120 to 220 L/acre water or 75 mL in 10 L water per 1076 square feet (100 square metres). Direct spray near base of canes early in spring before new raspberry shoots emerge. Spray till leaves of weeds are wet. Do not spray past run-off.

2,4-D Controls several broadleaf weeds. (Table 11) Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D amine in 40 to 90 L/acre water. For product volumes of other 2,4-D formulations refer to Table 14. Application may be made at any time throughout the growing season when weeds are growing actively except when raspberries are in blossom. Care should be taken to keep the chemical off new shoots as much as possible.

Strawberries

Sinbar (80%) Controls annual grasses and broadleaf weeds. (Table 11)

New plantings

Apply 0.141 to 0.214 kg/acre product. Apply after mother plants are well established but before new runner plants start to root (usually four to six weeks after planting)

After renovation on established stands

Apply 0.141 to 0.214 kg/acre product after renovation and follow with application before mulching.

Before mulching in fall

Apply 0.283 to 0.405 kg/acre product in not less than 130 L/acre water.

Use the lower of the recommended rates on sandy soil with low organic matter and on sensitive varieties such as Earlidawn, Midway, Bounty, Micmac and Sparkle. Temporary minor foliage injury may occur after application. *Use only on healthy, vigorous plants.* Weak, diseased or injured plants are subject to serious injury. Risk of strawberry plant injury is reduced if 0.6 to 1.2 inches (1.5 to 3 cm) of rain or irrigation follows immediately after application. Sinbar must be applied accurately within recommended application rates.

Growers using Sinbar for the first time, or growers changing production practices should treat only a limited area until experience is gained with Sinbar. Do not replant treated areas to any crop within two years after the last application as injury to subsequent crops may occur. To reduce replanting injury to subsequent crops, cultivate or plough soil thoroughly.

Postemergence

Enide (50%) Controls volunteer grains, barnyard grass and green and yellow foxtail. (Table 11) Apply 3.64 to 5.46 kg/acre product in at least 180 L/acre water. Apply immediately before mulching in late fall. Enide does not leave a residue in the soil the following year. It may be considered to reduce restrictions on subsequent crops.

Tenoran (50%) Controls several broadleaf weeds. (Table 11) Apply 3.64 to 4.45 kg/acre product in 120 to 200 L/acre water. Apply when weeds are less than 1 to 2 inches (2.5 to 5 cm) tall.

Irrigate immediately after application or apply just before or during a rain. Control should be effective for three to six weeks, after which Tenoran can be reapplied to newly emerged weeds. In the year of establishment, do not apply for four to five weeks after transplanting. In the bearing years, do not apply until after harvest.

Home Grounds

Lawns

A sound management program on turf that provides vigorous growth of grass helps control weeds. Include fertilizing, watering and cutting at the proper height in the program. However, the application of herbicides may be required to obtain a weed-free lawn. Two herbicide applications are recommended for satisfactory control. The first, prior to May 31, controls susceptible species such as dandelions while the second using herbicide mixtures, controls the hard-to-kill weeds, such as chickweed, clover and creeping Charlie.

Take care in applying herbicides as annual flowering plants and many shrubs are susceptible. Precautions include: use of low-pressure or no-pressure applicators, application on non-windy days only, and the covering up of susceptible plants with newspapers. Remove newspapers shortly after spraying.

New Lawns

Before establishing a lawn by either seeding or sodding, perennial weed problems such as Canada thistle, perennial sow-thistle and quackgrass must be brought under control. One or more flushes of annual weeds prior to seeding will reduce weed problems later. Precautions should be taken to prevent reinfestation through weeds setting seed, weedseed in lawn seed, and weeds in sod or topsoil.

Co-op Weedrite (5%), Weedrite (5%) Controls annual weeds and top growth of perennial weeds. Dissolve one sachet (57 g) in 10 L clean water and apply to 215 square feet (20 square metres) with a watering can, dribble bar or sprayer. If weed growth is extremely dense, apply to 107.5 square feet (10 square metres). Spray to thoroughly wet foliage. This treatment will burn off top growth of all green vegetation. Repeated treatments may be required. After a minimum of three days roto till thoroughly and prepare a good seedbed. Seed or sod and top dress.

2,4-D amine (200 g/L) Controls perennial thistles. Apply 75 mL in 10 L water/1076 square feet (100 square metres). For products with other concentrations refer to label for rates.

New lawns can be sprayed after the first cutting with treatments recommended for established lawns unless otherwise stated. Timely mowing can be used to supplement chemical control.

Weedrite see Co-op Weedrite.

Established Lawns

Any time after first cutting

CAUTION: *Do not apply these herbicides to bent grass species except where specifically recommended.*

Co-op Lawn Weed Killer (200 g/L), Weed No-More (150 g/L) Controls perennial thistles, dandelions, plantain, mustard, stinkweed and lamb's-quarters. For best results spray dandelions before blooms appear in spring. Apply 75 mL Co-op Lawn Weed Killer in 10 L water/1076 square feet (100 square metres). Use half the recommended rate on bent grasses. Apply Weed No-More at 120 mL in 20 L water/1076 square feet (100 square metres). For control of dandelion and plantain apply Co-op Premium Spot Weed Killer (ready to use without mixing). Wet the weeds with one or two short bursts.

Co-op Premium Lawn Weed Killer (250 g/L), Killex (159 g/L) Controls black medick, chickweed, ground ivy (creeping Charlie), knotweed, common plantain, clover and other 2,4-D resistant weeds. Apply Co-op Premium Lawn Weed Killer at 100 mL in 10 L water/1076 square feet (100 square metres) of lawn area. Use Killex at 120 mL in 20 L water/1076 square feet (100 square metres) in spring or early fall when temperatures are above 10°C (50°F). Do not spray for several days after mowing, during hot spells or when rain is forecast. Killex should not be applied to newly seeded lawns until after the third mowing. For knotweed apply in May when plants are small. To treat ground ivy apply when growth begins and as often as necessary when regrowth appears. Co-op Premium Spot Weed Killer (ready to use), will give similar results. Do not use on bent grasses. Do not water within 24 hours after application

Killex see Co-op Premium Lawn Weed Killer.

Weed No-More see Co-op Lawn Weed Killer.

Other formulations consisting of aerosols, fertilizer mixes and wax bars are available. These will give weed control if used as directed on the label but are no more effective than the above sprays. Be sure to use the proper chemical, apply as directed on the label and take precautions to prevent drift. Use only amine formulations which are non volatile.

No selective herbicide is available to remove quackgrass in a blue grass lawn. Relatively good control of quackgrass may be obtained by the following maintenance procedures:

- **Fertilize two or three times a year to produce a vigorous growth of lawn grass.**
- **Apply adequate water to promote good growth of the grass.**

- **Mow lawn twice a week at 1.6 to 2 inches (4 to 5 cm) height during the active period of growth. This will promote continual growth of the lawn grass but will stunt growth of the quackgrass.**

For complete control of quackgrass it may be necessary to renovate. Follow recommendations in the section on establishing new lawns for information on quackgrass control.

Shrubs, Trees, Flowers and Ornamentals

Herbicides can be used to control annual weeds, reducing the amount of hand weeding required.

Hoe-No-More (4%), No-Hoe (4%) Controls barnyard grass, green and yellow foxtail, chickweed, lamb's-quarters, pigweed, purslane, ragweed and annual smartweed species. A 500 gram package of Hoe-No-More will treat 591 square feet (55 square metres) and a 500 gram package of No-Hoe will treat 807 square feet (75 square metres). Refer to label for rates for specific situations. Apply to bare soil or after tilling or hoeing. Do not disturb treated soil. Avoid application to foliage of desirable plants and do not apply when foliage is wet.

Rainfall after application will improve control. If no rain falls within three to four days after application, water the area lightly to activate the herbicide. If water is not available very shallow cultivation may be necessary.

Weeds are controlled as they begin to grow. Control can be expected for six to eight weeks depending on weather conditions.

Co-op Garden Weed Preventer (1.47%) Controls barnyard grass, green and yellow foxtail, chickweed, knotweed, pigweed, lamb's-quarters and annual smartweed species. Apply 3 kg product/1076 square feet (100 square metres) or 30 g product/10.8 square feet (1 square metre) before weeds emerge. Weeds already growing will not be controlled.

Soil to be treated should be loose and free of clods. Apply by shaking container over the area to be treated. Incorporate into the top 0.8 inches (2 cm) of soil by hand raking. Water lightly. For best results, apply in the spring. For annual flowers apply only after they become established (about two weeks after transplanting). Use only around ornamentals, shrubs and other established plants not used for food.

Co-op Weedrite (5%), Weedrite (5%) Controls top growth of all weeds. Dissolve one sachet (57 g) in 10 L clean water and apply to 215 square feet (20 square metres). If weed growth is extremely dense, double the rate of chemical and water. Can be used around ornamental shrubs and trees. Spray must not contact green bark or foliage. Re-treatment will be required for regrowth of perennial weeds or newly emerged weeds.

No-Hoe see Hoe-No-More.

Weedrite see Co-op Weedrite.

Vegetable Gardens

Because of the wide variety of plants growing in a small area, herbicides have limited use in vegetable gardens. Large gardens can be treated according to recommendations for commercial vegetable production.

Quackgrass and perennial thistles can be controlled according to recommendations for lawn renovation. It may be necessary to leave the area out of production for at least part of the year.

Vegetation Burn-Off

Vegetation burn-off refers to the complete top growth control of all vegetation. This type of control is desirable along fence lines, driveways, and patios. Soil sterilants are not recommended for residential use.

Co-op Weedrite (5%), Weedrite (5%) Dissolve one sachet (57 g) in 10 L clean water and apply to 215 square feet (20 square metres). If weed growth is extremely dense, apply to 107.5 square feet (10 square metres). Spray must not contact green bark of trees or desirable vegetation. Re-treatment will be required for regrowth of perennial weeds or newly emerged weeds.

Unique Weed Problems

Many weed species are introduced as ornamentals and escape to create serious weed problems. Do not plant species which could create a weed problem.

Creeping bellflower, scentless chamomile, and kochia

Co-op Premium Lawn Weed Killer (250 g/L), Killex (159 g/L) Apply Co-op Premium Lawn Weed Killer at 100 mL in 10 L water/1076 square feet (100 square metres) of lawn area or Killex at 120 mL in 20 L water to 1076 square feet (100 square metres). Spray to give thorough coverage. Apply in early spring or fall and repeat as necessary for regrowth. Good lawn management with frequent mowings will slowly starve the root system of creeping bellflower and will supplement chemical control. Well established plants can be dug out to improve control.

Killex see Co-op Premium Lawn Weed Killer.

Cypress spurge, snow on the mountain

2,4-D amine (200 g/L) Apply 75 mL in 10 L water/ 1076 square feet (100 square metres). For products with other concentrations refer to label for rates.

Foxtail Barley

Co-op Weedrite (5%), Weedrite (5%) Will not give selective control in a lawn. Dissolve one sachet (57 g) in 10 L clean water and apply to 215 square feet (20 square metres). If weed growth is extremely dense, apply to 10 square metres. Re-treatment will be required for regrowth of foxtail barley and newly emerged seedlings. Foxtail barley is an indicator of poor drainage and salinity. Unless the soil problem is corrected reinfestation will occur.

Poison Ivy

Amitrol-T (200 g/L) Apply 375 mL in 25 L water. Thoroughly wet all foliage. Treat after leaves are fully developed in the spring until leaves start to turn colour in the fall. This treatment is not selective.

Roundup (356 g/L) Apply 75 to 125 mL/1076 square feet (100 square metres) when poison ivy has reached early bud stage. Allow seven or more days after application before tillage. This treatment is not selective.

Purslane (portulaca)

2,4-D amine (200 g/L) Apply 75 mL in 10 L water/ 1076 square feet (100 square metres) between rows in a garden. For products with other concentrations refer to label for rates. Do not allow the spray mixture to contact or drift onto desirable plants.

Red Bartsia

2,4-D amine (200 g/L) Apply 75 mL in 10 L water/ 1076 square feet (100 square metres). For products with other concentrations refer to label for rates. Treat during early growth, usually in early July. Re-treat if necessary.

Round-leaved Mallow

2,4-D amine (200 g/L) Apply 75 mL in 10 L water/ 1076 square feet (100 square metres). For products with other concentrations refer to label for rates. Apply during early stages of growth.

Scentless Chamomile

See creeping bellflower recommendation.

Snow on the Mountain

See cypress spurge recommendation.

Home Ground Herbicides

Herbicides recommended are available at most garden supply centres.

Parks and Golf Courses

A sound management program on turf that promotes vigorous growth of grass helps to control weeds. Fertilizing, watering and cutting at the proper height should be included. The application of herbicides may be required to obtain weed-free turf. Two herbicide applications are recommended for satisfactory control. The first, prior to May 31, controls susceptible species such as dandelions and the second with a herbicide mixture controls the hard-to-kill weeds such as chickweed, clover, and creeping Charlie.

Care should be taken in the application of herbicides to prevent drift onto susceptible flowers, shrubs and trees. Precautions include the use of low-pressure or no-pressure applicators and application on non-windy days only.

Banvel (480 g/L) Controls clover, mouse-eared chickweed and erect knotweed. Apply 0.51 L/acre in 45 L/acre water. A tank mix of Banvel at 0.51 L/acre plus 2,4-D amine at 0.445 to 0.89 L/acre of formulations containing 500 g/L 2,4-D is particularly effective against dandelion and plantain. For product volumes of other 2,4-D amine formulations, see Table 14. Apply to newly seeded grasses only after second mowing. Do not apply to bent grass. Do not apply closer than the drip line of trees and shrubs. Do not rake, mow or water lawn within 24 hours after application.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Betasan (480 g/L or 12.5% granular) Controls annual bluegrass. Apply 610 mL in 60 to 120 L water/2152 square feet (200 square metres) or 1.35 kg granular product/1076 square feet (100 square metres). Can be used on bent grass species.

Compitox (150 g/L) Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 4.45 L/acre in 120 to 160 L/acre water. Can be used on bent grass species.

Compitox Plus (200 g/L) Controls chickweed, ground ivy, (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 3.40 L/acre in at least 90 L/acre water.

Co-op Premium Turf Herbicide (250 g/L) Controls clover, chickweed, dandelions, plantain, knotweed, black medick, ground ivy (creeping Charlie). On established turf, apply 90 mL in 10 L water/1076 square feet (100 square metres) or 3.14 to 3.44 L/acre in 120 L/acre water. Treat when weeds are growing actively and temperature is not over 30°C (86°F) in late May or early June, or during late August or early September.

For an extensive infestation of ground ivy, treat in June and September for two seasons. For knotweed, apply in May or June. On bent grass, only apply as a spot treatment. Bent grass around the weed may be injured.

Killex (318 g/L) Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 2.23 L/acre in at least 90 L/acre water. Can be used on bent grass species at the rate of 30 mL in 20 L water applied to 1076 square feet (100 square metres). Do not apply to newly seeded turf until after the second or third mowing. Do not water within 24 hours after application.

Mecoturf (150 g/L), Mecoturf Plus 2,4-D (400 g/L) Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick, and other 2,4-D resistant weeds. Apply 2.23 to 3.44 L/acre Mecoturf or 1.72 to 2.23 L/acre Mecoturf Plus 2,4-D in at least 90 L/acre water. Mecoturf can be applied to bent grass species if temperature is below 27°C (81°F). Do not apply Mecoturf Plus 2,4-D to bent grass species.

Mecoturf Plus 2,4-D see Mecoturf.

MCPA amine or MCPA mixtures of sodium and potassium salts or 2,4-D amine Controls dandelions, plantain and perennial thistles. Apply 1.21 L/acre of formulations containing 500 g/L MCPA or 2,4-D in 45 L/acre water. For product volumes of various 2,4-D and MCPA formulations refer to Table 14. Do not apply 2,4-D on bent grass species.

Propaturf (700 g/L) Controls black medick, ground ivy (creeping Charlie), round-leaved mallow, stinkweed and other 2,4-D resistant weeds. Apply 1.42 L/acre in at least 90 L/acre water. Do not apply to bent grass species.

2,4-D see MCPA.

Totril (225 g/L) Controls chickweed, ground ivy (creeping charlie), knotweed and clover. Mix 30 to 45 mL in 10 to 20 L water and apply to 1076 square feet (100 square meters) as soon as grass seedlings have reached a height of 1 inch (2.5 cm). Can be used on fescue, bluegrass and bentgrass species. Some temporary tip scorch on grass may occur. Spray when weeds are growing actively. Do not spray in drought conditions.

Totril (225 g/L) + Compitox (150 g/L) Controls Veronica (speedwell), clover, plantain, and chickweed. Mix 30 mL Totril in 10 to 20 L of water, then mix in 90 mL Compitox and apply to 1076 square feet (100 square meters) of turf. Repeat application in two to three weeks using the same rate. Best control of speedwell is obtained by spraying in the spring before the plants have flowered. Do not spray in drought periods or in periods of prolonged cool wet weather. Do not mow the grass for three to four days before or after spraying. May be used on established bluegrass, bentgrass and fescues.

Turf Renovation

Roundup (356 g/L) Controls perennial grasses and broadleaf weeds. Apply 1.92 to 2.83 L/acre in 45 L/acre water when broadleaf weeds are in the bud to bloom stage and when grassy weeds are at least 8 to 10 inches (20 to 25 cm) tall. For specific application rates refer to the *Perennial Weed Control on Cropland* section or the *Special Weed Problems* section.

NOTE: All vegetation in the treated area will be destroyed.

Non-Crop Weed Control

Aquatic Weeds (Agricultural)

Farm Ponds and Dugouts

Copper Sulphate (Bluestone) Controls algae. Apply 500 g of copper sulphate (bluestone) per 450,000 L of water. (Table A) Best control is achieved on a calm, hot day. This does not control all species of algae. Retreat as required to control reinvasion of algae. Copper sulphate will not spread by itself. Therefore, complete coverage of the dugout during application is essential. Swimming should not be allowed during and for a short period after treatment.

Table A — Weight of copper sulphate required to treat a 60 m X 20 m X 4 m dugout.

Approximate Water Depth m	Approximate Water Volume L	Weight Copper Sulphate kg
4.0	3,000,000	3.0
3.5	2,200,000	3.0
3.0	1,600,000	1.6
2.5	1,100,000	1.0

Cutrine-Plus (3.7% granular) Controls algae and aquatic weeds such as chara.

For large areas apply at the rate of 13.59 kg/acre, and distribute evenly over the water surface directly over the vegetation to be treated. For spot treatment apply directly over the infested area at the rate of 6.80 g/square metre. Heavy growth may require retreatment.

Chara should be treated early in the season. As the season progresses chara becomes resistent.

To avoid suffocation to fish due to a lack of oxygen caused by decaying vegetation, never treat more than 1/3 to 1/2 of the pond at a time. Allow sufficient time between treatments for oxygen levels to recover (usually one to two weeks). Begin treatment along shore and proceed outwards in bands to allow fish to move into untreated areas.

CAUTION: *Cutrine-Plus may be toxic to trout and other fish species. Fish toxicity is dependent upon the hardness of water. (See label for additional precautions and application instructions.)*

Karmex (80%) Controls algae and aquatic weeds such as pondweed and chara. Use the lower rate for algae control and the higher rate for aquatic weeds and extended algae control. Use only in ponds with little or no water flow through.

For a dugout 21 m X 61 m X 1 m deep, apply 800 to 1600 g Karmex for algae control. For submergent aquatics apply 2.4 to 3.2 kg Karmex. For deeper water, increase rate proportionally.

Do not use in domestic water supply. Do not use treated water for irrigation within one year of treatment. Do not use if desirable trees or shrubs have roots extending to the water. If Karmex is to be used in farm ponds or dugouts a supplement to the label must be obtained from your chemical dealer as the required information is not on the container label.

Princep Nine-T (90%), Simmaprim (80%) Controls filamentous algae, submerged aquatics and chara. If filamentous algae is present, apply 5 g product of Princep Nine-T or 6 g product of Simmaprim to 10,000 L water. If submerged aquatics are present, apply 10 g product of Princep Nine-T or 12 g product of Simmaprim to 10,000 L water. For chara control, apply 20 g product of Princep Nine-T or 24 g product of Simmaprim, in 10,000 L water.

For a dugout 21m x 61m x 4m which contains approximately 3,000,000 L when full, apply 1.5 kg product of Princep Nine-T or 1.8 kg product of Simmaprim to control filamentous algae. If submerged aquatics are present, apply 3.0 kg product of Princep Nine-T or 3.6 kg product of Simmaprim. For chara control, apply 6 kg product of Princep Nine-T or 7.2 kg product of Simmaprim.

Although Princep Nine-T or Simmaprim are low in toxicity to mammals, there is no residue tolerance established for it in fish. Therefore, fish taken from the treated ponds should not be used for human consumption.

NOTE: Use Princep Nine-T or Simmaprim early in the season before dense growths of algae or submergent vegetation are present because of possible hazard to fish from oxygen depletion as the plants decompose and also for more effective control. Algicides are not effective for partial treatments in large ponds where there is a significant flow through at the time of treatment and for about 10 days. Treated water that contacts grass and other vegetation may cause damage. Avoid using where willow or valuable trees or shrubs are growing along the margins of the pond. Water treated with these products can be used for animal consumption. Do not use water for irrigation or human consumption for one year.

Reglone A (200 g/L) Controls duckweed, coontail, Canada water weed, pondweed, water milfoil. For a dugout 21m x 61m, but less than 1.5m deep apply 2.82 L. If over 1.5m deep, apply 3.8 to 4.5 L. Apply early in season just after weeds begin active growth. Apply as overall spray. If duckweed is not present, application may be by injection. Avoid use of water for human and animal consumption for 24 hours after application. Do not use water for irrigation for five days after application. Repeat treatment if regrowth occurs.

Simmaprim see Princep Nine-T.

Ditches

See Note A under non agricultural aquatic weed control.

Drainage Ditches

Gramoxone S (200 g/L) plus Reglone A (200 g/L) Controls coontail, duckweed, Canada water weed, pond weeds and water milfoil. Apply 2.23 L/surface acre Gramoxone S plus 2.23 L/surface acre Reglone A to water no deeper than 2.5 ft (0.75 m). For water deeper than 2.5 ft (0.75 m), apply 4.45 L/surface acre Gramoxone S and 4.45 L/surface acre Reglone A. Consult label for directions on injection and timing.

Princep Nine-T (90%), Simmaprim (80%) Controls rooted aquatic weeds and most annuals. Apply 9.71 kg/acre product of Princep Nine-T or 11.33 kg/acre product of Simmaprim in 200 to 810 L water. Apply to soil surface when area is dry. Discing after application assists in controlling deeply rooted weeds.

Reglone A plus Gramoxone S see Gramoxone S plus Reglone A.

Simmaprim see Princep Nine-T.

Irrigation and Drainage Ditches

Karmex (80%) Controls coontail, duckweed, Canada waterweed, pond weeds and water milfoil. Apply 9.31 to 27.11 kg/acre product in 120 L/acre water. For irrigation ditches, apply during the non-crop season and when ditch is not in use. To minimize the movement of Karmex with irrigation water and avoid possible crop injury, the herbicide must be fixed in the soil by moisture.

Apply before expected seasonal rainfall (if possible, when soil in ditch is moist). Following treatment, if rainfall has not totalled at least 4 inches (10 cm) fill the ditch with water and allow to stand for 72 hours. Drain off waste water remaining before using ditch. Do not treat any ditch into which roots of trees or other desirable plants may extend as injury may result.

Surface Floaters

MCPA amine, 2,4-D amine Controls waterlillies. Apply 3.64 L/acre of formulations containing 500 g/L 2,4-D or MCPA in 445 L/acre water. For product volumes of 2,4-D and MCPA formulations refer to Table 14. Thoroughly wet leaves.

2,4-D amine see MCPA amine.

Emerged Aquatics

Amitrol-T (200 g/L) Controls cattails. Use 18.2 to 22.3 L/acre in at least 405 L water. Apply after cattails are fully formed and up to frost. Wet plants thoroughly. Do not allow spray to contact water which will be used for irrigation, drinking or other domestic purposes.

Basfapon (74%), Dowpon (74%) and Dowpon M (74%) Controls cattails and bulrushes. Apply 6.1 to 10.2 kg/acre product in 405 L/acre water. Spray when sprouts have emerged and are 24 to 36 inches (60 to 90 cm) tall. The addition of 2,4-D will control broadleaf weeds and woody plants. Do not use water in ditches treated with Basfapon, Dowpon and Dowpon M for irrigation until tested to be safe on the crops to be irrigated.

Dowpon, Dowpon M see Basfapon.

Gramoxone S (200 g/L) Controls cattails and bulrushes. Apply 2.23 to 4.45 L/acre in 120 L/acre water at the early flowering stage.

Roundup (356 g/L) Controls cattails. Apply 2.83 to 4.85 L/acre in 45 L/acre water when cattails are in the mid to late flowering stage (mid July to mid August) and are actively growing.

2,4-D Controls cattails and bulrushes. Apply 3.64 L/acre of formulations containing 500 g/L 2,4-D in sufficient water to thoroughly wet the foliage. For product volumes of 2,4-D formulations refer to Table 14.

Aquatic Weeds (Non-Agricultural)

NOTE A: *Any individual or organization intending to apply any herbicide to a body of water not totally contained within their own property must register with The Environmental Control Branch of the Department of the Environment and Workplace Safety and Health.*

Information about the area being treated, the weeds being controlled, the herbicides to be used, and other information on the use of the water should be supplied on the form provided by:

Environmental Management Branch
Box 7, Building 2, 139 Tuxedo Blvd.
Winnipeg, Manitoba

Lakes, Ponds, Canals, Irrigation and Drainage Ditches

Copper Sulphate (Bluestone) Controls algae. Apply 500 g of copper sulphate (bluestone) per 450,000 L of water. (Table A) Best control is achieved on a calm, hot day. This does not control all species of algae. Retreat as required to control reinvasion of algae. Copper sulphate will not spread by itself. Therefore, complete coverage of the dugout during application is essential. Swimming should not be allowed during and for a short period after treatment.

Table A — Weight of copper sulphate required to treat a 60 m X 20 m X 4 m dugout.

Approximate Water Depth m	Approximate Water Volume L	Weight Copper Sulphate kg
4.0	3,000,000	3.0
3.5	2,200,000	3.0
3.0	1,600,000	1.6
2.5	1,100,000	1.0

Reglone A (200 g/L) Controls duckweed, coontail, Canada water weed, pondweeds and water milfoil. Apply 8.9 L/surface acre to water up to 1.5 m deep, or 12.1 to 14.2 L/surface acre to water over 1.5 m deep early in season just after weeds begin active growth. Apply as overall spray. If duckweed is not present, application may be by injection. Avoid use of water for human and animal consumption for 24 hours after application. Do not use water for irrigation for five days after application. Repeat treatment if regrowth occurs.

Drainage Ditches, Canals, Urban Ponds and Beach Areas

Gramoxone S (200 g/L) plus Reglone A (200 g/L) Controls coontail, duckweed, Canada water weed, pondweeds and water milfoil. Apply 2.23 L/surface acre Gramoxone S plus 2.23 L/surface acre Reglone A to water up to 2.5 ft (0.75 m) deep. For deeper water apply 4.45 L/surface acre Gramoxone S and 4.45 L/surface acre Reglone A. Check label for directions on injection and timing.

Princep Nine-T (90%), Simmaprim (80%) Controls rooted aquatic weeds and most annuals. Apply 9.71 kg/acre product of Princep Nine-T or 11.33 kg/acre product of Simmaprim in 200 to 810 L/acre water. Apply to soil surface when area is dry. Discing after application will assist in control of deeply rooted weeds.

CAUTION: *Do not apply where roots of desirable vegetation can extend into treated area.*

Reglone A plus Gramoxone S see Gramoxone S plus Reglone A.

Simmaprim see Princep Nine-T.

Surface Floaters

MCPA amine, 2,4-D amine Controls waterlillies. Apply 3.64 L/acre of formulations containing 500 g/L 2,4-D or MCPA in 445 L/acre water. For product volumes of other 2,4-D and MCPA formulations refer to Table 14. Thoroughly wet leaves.

2,4-D amine see MCPA amine.

Emerged Aquatics

Basfapon (74%), Dowpon (74%) and Dowpon M (74%) Controls cattails and bulrushes. Apply 6.07 to 10.12 kg/acre product in 405 L/acre water. Spray when sprouts have emerged and are 24 to 36 inches (60 to 90 cm) tall. The addition of 2,4-D will control broadleaf weeds and woody plants. Do not use water in ditches treated with Basfapon, Dowpon and Dowpon M for irrigation until tested to be safe on the crops to be irrigated.

Dowpon, Dowpon M see Basfapon.

Gramoxone S (200 g/L) Controls cattails and bulrushes. Apply 2.23 to 4.45 L/acre in 120 L/acre water at the early flowering stage.

Roundup (356 g/L) Controls cattails. Apply 2.83 to 4.86 L/acre in 45 L/acre water when cattails are in the mid to late flowering stage (mid July to mid August) and are actively growing.

2,4-D Controls cattails and bulrushes. Apply 3.64 L/acre of formulations containing 500 g/L 2,4-D in sufficient water to thoroughly wet the foliage. For product volumes of other 2,4-D formulations refer to Table 14.

Brush Control

Several alternative herbicides are available for brush control. Applicators should be aware of the alternatives for each situation, and the limitations or concerns associated with each herbicide.

Tordon products are residual and may damage desirable vegetation if off-target movement occurs. Dicamba products restrict grazing after application. All brush control products can cause damage to adjacent vegetation if off-target drift occurs.

Select brush control herbicides only after considering suitability for brush to be controlled, restrictions on use of treated area, potential damage to adjacent areas, cost and public concern.

NOTE: *Use the higher rates when brush growth is over 2 m (6.6 feet) high. Treat at full leaf stage. Good spray coverage is essential. Re-treatment may be necessary the following year.*

Banvel (480 g/L), DyCleer (400 g/L) Controls western snowberry (buckbrush), wolf willow, trembling aspen, alder and wild rose. Tank mix 2.08 L Banvel or 2.5 L DyCleer with 4 L of formulations containing 500 g/L 2,4-D amine or LV ester in 1000 L water. Apply to the point of run-off in June when leaves are fully expanded. Cut brush and trees over 2 m (6.6 feet) and spray regrowth when it develops. For product volumes of other 2,4-D formulations see Table 14.

For balsam poplar, basswood, birch, elm, black cottonwood, spruce, pine, balsam fir, tamarack, white cedar, hickory, vine maple, red oak, and bur oak apply a tank mix of 5 L DyCleer with 8 L of formulations containing 500 g/L 2,4-D amine or LV ester in 1000 L water. For product volumes of other 2,4-D formulations see Table 14. Apply to the point of run-off in June when leaves are fully expanded. Cut brush and trees over 2 m (6.6 feet) and spray regrowth when it develops.

To control spruce, pine, balsam fir, tamarack and white cedar apply a tank mix of 6.25 L DyCleer with 3.57 L Diphenoprop 700 or Silvaprop (700 g/L) in 1000 L water. Apply in June to coniferous and deciduous species when leaves are fully expanded. Apply to the point of run-off. Brush and trees over 2 m (6.6 feet) should be cut and regrowth sprayed when it develops.

CAUTION: *Banvel is available at two different strengths. Consult the product label to confirm that correct rates have been chosen for the product concentration being used.*

Desormone 7 (700 g/L) Controls alder, aspen, birch, western snowberry (buckbrush), hazel, honeysuckle, poplar, sumac, elderberry, and willow. Apply 7 L in 1000 L water as a foliage spray after leaves are fully developed. During dry weather or late season spraying apply 10 L in 180 L diesel oil plus 810 L water. For early season application apply 7 to 10 L in 100 L diesel oil plus 890 L water.

Basal bark treatment

Apply 20 to 27 L in 1000 L oil to the base of the stem during any season. This mixture can also be applied to wet the remaining leaves and stems.

Stump or frill treatment

Apply 27 L in 1000 L oil to the stump, exposed bark and exposed roots of a cut tree, or apply to a continuous ring cut in the bark around the base of the tree. Stump treatment may be applied in any season but preferably as soon as possible after trees have been cut. Application can be made to freshly cut frill at any time of year, preferably to trees with a diameter greater than 5 inches (13 cm).

DyCleer see Banvel.

DyCleer 24 (600 g/L) Controls western snowberry (buckbrush), wolf willow, trembling aspen, alder, wild rose, cherry. Apply 5 L in 1000 L water.

To control balsam poplar, basswood, birch, elm, black cottonwood, bur oak, white spruce, pine, balsam fir, tamarack and white cedar, apply 10 L in 1000 L water. Apply chemical in June when leaves are fully expanded. Thoroughly wet foliage. Brush and trees over 6.6 feet (2 m) should be cut and regrowth sprayed when it develops.

Banvel 10G (10%) Controls alder, aspen, balsam fir, birch, elm, pincherry, poplar, spruce, willow. Apply 20.2 to 28.3 kg/acre product.

To control cherry and mixed species of the above apply 28.3 to 34.4 kg/acre product. Apply when rain can be expected in the spring or early summer to species up to 6.6 feet (2 m).

Gramoxone (200 g/L) Controls balsam fir, black spruce, cedar, red pine, Scots pine and tamarack. Apply 2.23 to 4.45 L/acre in 405 L/acre water to give a good spray coverage of the trees.

Krenite (480 g/L) Controls oak, maple, common alder, hazel, ash, elm, poplar, willow, birch, aspen, pine and balsam fir. Apply 10 to 15 L in 1000 L. Add 1 to 2 L surfactant to 1000 L mixture. Apply at high pressure in 200 to 1200 L/acre; the volume depends upon height, density and type of brush. Spray to wet. Apply from mid-June to late September.

Krenite activity is often delayed and plants will remain green for most of the season after treatment. Susceptible plants will fail to leaf out the spring following treatment. This treatment is useful where browning of foliage is undesirable. If rainfall occurs within 24 hours effectiveness may be decreased.

NaTA TCA (85%) Controls conifers. Apply 9 to 11.3 kg product in 454 L water to give a good spray coverage of the trees. Spray during the growing season.

Silvaprop LV 700 1:1 Brushkiller (700 g/L) To control hawthorn, poplar, Scots pine, white cedar, wild cherry, wild plum and wild raspberry, foliar apply 7.5 L in 1000 L water.

To control alder, aspen, basswood, balsam fir, birch, bur oak, blueberry, elderberry, elm, ground juniper, hazel, honeysuckle, Manitoba maple, raspberry, red pine, rose (some regrowth), sumac, tamarack and willow, foliar apply 10 L in 1000 L water.

For best results apply on the foliage and stems just prior to or just after brush is in full leaf in the late spring or early summer. Many species may require retreatment the following year. Thoroughly wet down all foliage and stems to ground level. Apply 305 to 610 L/acre of spray mixture depending on brush density and height.

Basal treatment

To control susceptible and intermediate species apply 2.8 L in 100 L fuel oil. Hard to kill species can be controlled by increasing the rate to 4.4 L in 100 L fuel oil. The solution can be applied to the basal part of the standing brush during anytime of the year. This treatment is not effective for basswood and ash. Apply thoroughly to cause runoff on all sides of stems from ground line to 1 m (3.3 feet).

Stump treatment

Apply 2.8 L in 100 L fuel oil to tree stumps immediately after cutting by spraying or painting stumps, exposed roots and cut surface. Thorough drenching is essential.

Frill treatment

Apply 2.8 L in 100 L fuel oil. Cut frills with axe (downward) close together around the trunk without removing bark. Spray or paint exposed wood until run off. This method is recommended for resistant standing trees of more than 13 to 15 cm (5.2 to 6 inches) in diameter.

Roundup (356 g/L) Controls birch, poplar, raspberry, western snowberry (buckbrush) and willow. Apply 1 part/100 parts water to actively growing brush (June through August). Spray coverage must be uniform and complete for best results. Do not spray to runoff.

Tordon 10K Pellets (10%) Controls coniferous and deciduous species. Apply 28.3 kg/acre product. **Use of this product is restricted to authorized applicators.**

Tordon 101 (300 g/L) Controls coniferous and deciduous species. Apply 4.5 L of product in 450 L water and drench foliage. Apply to woody plants 2 to 2.5 m (6.6 to 8.3 feet) tall up to three weeks before the first killing frost. **Use of this product is restricted to authorized applicators.**

2,4-D LV Ester Controls birch, honeysuckle, scrub poplar, western snowberry (buckbrush), willows, wolf willow and regenerated poplar. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in not less than 90 L water, with ground equipment. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in 13.6 to 27.1 L/acre diesel oil for application by aircraft. For product volumes of other 2,4,-D formulations refer to Table 14. Apply between June 15 and July 15, before abscission layer is formed.

Dormant Spraying

2,4-D LV Ester Controls birch, honeysuckle and poplar. Apply 1.62 L/acre of formulations containing 500 g/L 2,4-D in 13.6 L/acre diesel oil for application by aircraft. For product volumes of other 2,4-D formulations refer to Table 14. Applications of 2,4-D LV ester in a mixture of 13.6 L/acre diesel oil and 4.45 L/acre water have given good control when applied to poplar at bud stage. Caution is required to maintain the spray mixture by agitation and to prevent freezing of equipment. However, do not over agitate, as gel may form. This application does not give effective control of undergrowth or regenerated poplar. A foliar application is usually required two to three years after application of the dormant spray.

2,4-D LV Ester Controls birch, honeysuckle and poplar. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in 112 to 169 L diesel oil applied with ground equipment. For product volumes of other 2,4-D formulations refer to Table 14.

Spot Treatment

Hyvar XL (240 g/L) Controls alder, maple, aspen, ash, sumac, balsam poplar, oak, elm, basswood, hawthorn, willow, birch, spruce, dogwood, and pine. Apply in spring or summer, undiluted, using an exact delivery hand gun which delivers a thin stream of a measured volume when triggered. Apply one 8 ml deposit directed at the base of brush (root collar area) for plants up to 1 m (3.3 feet) high, two deposits on either side of plants up to 2 m (6.6 feet), 3 deposits around a 3 m (9.9 feet) plant, and four to five deposits on taller brush. An extra deposit may be required to control ash. For larger areas requiring non-selective brush control, apply one 8 ml deposit on a 1 to 1.2 m (3.3 to 3.4 foot) grid.

Hyvar XL may also be applied diluted, 1 L Hyvar XL with 5 L water, using a back-pack or large volume equipment. Apply 55 ml per deposit rather than 8 ml as recommended above.

CAUTION: *Do not apply to brush in standing water. Water from treated ditches should not be used for irrigation. Do not apply in areas where desirable trees or shrubs are immediately adjacent to the treated area.*

Deciduous or Coniferous Species as per label clearance.

Product Amount for Small Areas

Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendations.

For a 1076 sq ft (100 m^2) Area

To convert from L/acre to mL/1076 sq ft (100 m^2), multiply by 25. Eg. 2.5 L/acre — use 62.5 mL per 1076 sq ft (100 m^2)

A spray volume of 5 to 10 L/1076 sq ft (100 m^2) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre.

Before planting

Preplant Incorporated

Rival (500 g/L), Treflan EC (545 g/L), Triflurex (400 g/L) Tolerant species include American elm, caragana, green ash, Scotch pine and Siberian elm. Controls barnyard grass, chickweed, cow cockle, green and yellow foxtail, kochia, lamb's-quarters, prostrate knotweed, purslane, red root pigweed, Russian thistle, volunteer oats, wild buckwheat, wild oats. Apply:

	SOIL TEXTURE	
	Light texture sandy, sandy loam less than 6% organic matter	Heavy texture loam, silt, silty loam, clay, silt clay 6–15% organic matter
Rival	1.8 L/acre	3.6 L/acre
Treflan EC	1.62 L/acre	3.32 L/acre
Triflurex	2.22 L/acre	4.45 L/acre

Wild mustard will not be controlled at these rates.

Preplant - Postemergence to Weeds

Roundup (356 g/L) Controls absinthe, annual blue grass, annual sow-thistle, Canada blue grass, Canada thistle, cattail, common milkweed, common ragweed, curled dock, downy brome, field bindweed, green and yellow foxtail, hemp dogbane, hoary cress, Kentucky blue grass, knotweed, kochia, lady's-thumb, lamb's-quarters, prickly lettuce, mustard, poison ivy, quackgrass, red root pigweed, Russian thistle, shepherd's-purse, smooth brome grass, toadflax, wild buckwheat, wild oats, wild vetch. Apply 1.92 to 2.83 L/acre in 45 L/acre water when the weeds are in the proper stage for control. Refer to the *Perennial Weed Control* on Cropland section and the *Special Weed Problems* section for details on application rates and timing.

After Planting

(New or Established)

Preemergence or Early Postemergence to Weeds

Afolan F (450 g/L), Lorox L (480 g/L) Controls annual smartweed species, annual sow-thistle, barnyard grass, common chickweed, dandelion (seedlings only), goosefoot, green and yellow foxtail (suppression only), groundsel, hemp nettle, knotweed, kochia, lamb's-quarters, perennial sow-thistle (seedlings only), plantain (seedlings only), prostrate pigweed, purslane, ragweed, red root pigweed, shepherd's-purse, stinkweed, wild buckwheat, wild radish, wormseed mustard. Apply 2.02 to 4.05 L/acre Afolan F or 1.82 to 3.64 L/acre Lorox L in 160 to 220 L/acre water. Do not apply with pressure greater than 40 psi (275 kPa). Apply as an overall spray to dormant stock or as a directed spray if buds have broken. Apply before or immediately after weeds emerge but before they are 4 to 6 inches (10 to 15 cm) tall. Do not apply Afolan F until at least ten days after tree transplanting or Lorox L until trees have been established one year. Afolan F or Lorox L may be tank mixed with Gramoxone.

Lorox L see Afolan F.

Postemergence to Weeds

Afolan F (450 g/L) or Lorox L (480 g/L) plus Gramoxone (200 g/L) Controls grasses and broadleaf weeds. Apply 2.23 to 4.45 L/acre Gramoxone plus 2.02 to 4.05 L/acre of Afolan F or 1.82 to 3.64 L/acre Lorox L in 220 to 445 L/acre water directed to base of trees. Avoid contact with tree foliage.

CAUTION: *Do not use on small conifers without protection.*

Gramoxone (200 g/L) Controls annual grasses and broadleaf weeds and top growth of perennials. Apply 2.23 to 4.45 L/acre in 220 to 445 L/acre water when weeds and grass are 4 to 6 inches (10 to 15 cm) tall. Repeat application if regrowth occurs. Direct spray on the weeds and avoid contact with the tree foliage. Wet foliage thoroughly. For patch treatment use 75 mL in 10 L water/1076 square feet (100 square metres).

CAUTION: *Do not use on small conifers without protection.*

Established More Than One Year

Preemergence to Weeds

Casoron 4 G (4%) Controls several grasses and broadleaf weeds such as annual blue grass, annual smartweed species, chickweed, green and yellow foxtail, field horsetail, groundsel, knotweed, lamb's-quarters, pineappleweed, purslane, red root pigweed, shepherd's-purse, annual spurge, wild mustard. Apply 44.5 to 70.8 kg/acre product in fall or spring. Use the lower rate on lighter soils. Avoid using on light sand or gravel soils. Do not cultivate or work into the soil. Avoid applications when soil temperatures are high.

NOTE: *Tolerant species include caragana, cutleaf weeping birch, crabapple, euonymus, juniper, and maple. Species not tolerant and which should be avoided include gladiolus, firs, hemlock, lilac, spruce and Mugho pine. For further information see manufacturer's label.*

Princep Nine-T (90%) Tolerant species include American elm, boxelder maple, caragana, green ash, Siberian elm. Controls annual smartweed species, annual sow-thistle, ball mustard, barnyard grass, bluebur, chickweed, common ragweed, dog mustard, false ragweed, flixweed, giant ragweed, hare's-ear mustard, hemp nettle, hoary alyssum, Indian mustard, kochia, lady's-thumb, lamb's-quarters, night flowering catchfly, oak-leaved goosefoot, prostrate knotweed, prostrate pigweed, purslane, red root pigweed, Russian pigweed, shepherd's-purse, stinkweed, tumble mustard, tumble pigweed, volunteer clover, wild buckwheat, wild mustard, wild oats, wild radish, wormseed mustard. Apply 2.02 to 3.04 kg/acre product in 200 L/acre water. Apply to trash free soil. Treatment should be made in the fall preferably, or in the early spring before the weeds emerge. Injury may occur to trees grown in saline soil.

Simadex (500 g/L), Simadex 80 W (80%) Tolerant species include caragana, green ash, Siberian elm, American elm and box elder maple. See Princep Nine-T for weeds controlled. Apply 3.64 to 5.46 L/acre Simadex or 2.23 to 3.44 kg/acre product Simadex 80 W in at least 200 L/acre water to trash free soil. Irrigate following application if soil is dry. Treatment should be made in the fall preferably, or in the early spring before weeds emerge. Injury may occur to trees grown in saline soils.

Postemergence to Weeds

Amitrol-T (200 g/L) Controls annual blue grass, barnyard grass, blue grasses, Canada thistle, chickweed, cocklebur, common burdock, common groundsel, dandelion, dock, field horsetail, foxtail barley, goldenrod, green and yellow foxtail, hemp nettle, hoary cress, lamb's-quarters, knotweed, kochia, milkweed, mustard, night-shade, night flowering catchfly, pigweed, plantain, poison ivy, purslane, ragweed, shepherd's-purse, smartweed, sow-thistle, toadflax, volunteer alfalfa, wild buckwheat, wild oats, witch grass, yellow rocket. Apply 8.9 to 14.2 L/acre in 200 L/acre water. See the *Special Weed Problems* section for details on application rates and timing. Avoid contact with tree foliage, shoots or green bark. Apply to wet all weed foliage.

Roundup (356 g/L) Controls absinthe, annual blue grass, annual sow-thistle, Canada blue grass, Canada thistle, cattail, common milkweed, common ragweed, curled dock, downy brome, field bindweed, green and yellow foxtail, hemp dogbane, hoary cress, Kentucky blue grass, knotweed, kochia, lady's-thumb, lamb's-quarters, prickly lettuce, mustard, poison ivy, quackgrass, red root pigweed, Russian thistle, shepherd's-purse, smooth brome grass, toadflax, wild buckwheat, wild oats, wild vetch. Apply 1.92 to 2.83 L/acre in 45 L/acre water when the weeds are in the proper stage for control. Apply only to shelterbelts containing caragana, elm, lilac, maple, mountain ash, poplar, Russian olive, willow, fir, juniper, pine, spruce or yew. Spray may contact mature bark only. Avoid contact with foliage, green bark or suckers. Spray coverage must be uniform and complete. Do not spray to runoff. Refer to *Perennial Weed Control on Cropland* section and the *Special Weed Problems* section for details on application rates and timing. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Soil Fumigants

Soil fumigants can be used to destroy weed seeds in soil where weed free conditions are required. Cost restricts these applications to small, intensively managed areas. Care must be taken to prevent reinfestation with weeds.

Problems with the fumigant remaining active in the soil and injuring the planted crop may occur. Observe label precautions regarding temperature and waiting period.

NOTE: *Follow label safety precautions*

Basamid Granular (98%) Apply 3.25 to 5 kg product/1076 square feet (100 square metres). Distribute evenly on the soil surface. This can be done by hand (with rubber gloves) or by means of a fertilizer spreader. Incorporate thoroughly and evenly into the soil to a depth of 6 to 9.2 inches (15 to 23 cm) immediately after application. After incorporation, irrigate to seal the Basamid Granular in the soil. Under normal weather conditions, a waiting period of three weeks before planting is necessary. If soil temperature averages below 16°C (60.8°F) or if soil does not receive additional moisture during the three weeks after treatment, a longer waiting period may be necessary. Aerate the soil before seeding. Refer to the label for specific directions on use.

Dowfume MC2 *Plant beds* Apply 680 g/150 square feet (14 square metres). Expose for 24 hours. Aerate ten days before planting. Clovers and round-leaved mallow require a longer exposure time.

Apply using equipment listed on label. Treatment area must be sealed with polyethylene. Prepare soil for planting prior to treatment. Soil must be moist at time of treatment. Soil temperature at 4 inches (10 cm) should be 15°C (59°F). Between 10°C and 15°C (50°F and 59°F), double exposure time. Do not apply if temperature is below 10°C (50°F). After aeration, till scil to speed further aeration.

Well rotted compost, manure, top soil

Apply 300 g/35.29 cubic feet (1 cubic metre). Expose 24 hours. Aerate 72 hours, with thorough stirring after 24 hours. Refer to label for instructions on sealing pile and application.

Mulching straw or hay

Apply 680 g per 6 bales. Expose 48 hours. Aerate 24 hours. Soak thoroughly several days before treatment. Refer to label for instructions on sealing pile and application.

PRECAUTIONS

- Be sure treated material is free from Dowfume MC2 before seeding or planting.
- Soils high in organic matter (muck, compost, heavily manured soil) should be fumigated at least two months before planting.
- Carnations, conifers, multiflora roses, snap dragons and certain other ornamental plants and shrubs are sensitive to Dowfume MC2 residues. Use on a limited scale for at least a full season before extensive use.
- When ammonia-sensitive plants such as tomatoes are to be grown, apply nitrogen fertilizer as nitrate nitrogen, or delay planting several months after fumigation.
- Use only for turf renovation, seed and plant beds (flowers, shade and forest trees, ornamental shrubs and vines) and vegetables (for production of transplants only).
- Dowfume must be stored apart from lodging for humans, animal quarters and normal work areas.

Mylone (50%) Apply 6.5 kg product in 1000 L water/1076 square feet (100 square metres). Spread evenly on the soil surface and add sufficient water to drench in Mylone and to form a water seal on the soil surface. Do not plant any crop for at least three weeks. If soil temperature is below 16°C (60.8°F), or if soil does not receive additional moisture after treatment, a longer waiting period is required.

Potting soil can be treated by applying Mylone to 6 inches (15 cm) layers of soil as a pile is made. Apply 4 kg/1076 square feet (100 square metres). Refer to label for additional detail. Do not use soil for at least three weeks after treatment. If soil temperature is below 16°C (60.8°F), a longer waiting period is required.

Vapam (380 g/L) Apply 2 to 3 L in 160 L water to 204 square feet (19 square metres). Use higher rate on heavy soils. Apply as a coarse spray. Prepare soil by thorough cultivation one week before treatment. Keep soil moist. Apply only if air temperature is less than 32°C (89.6°F) and winds are calm. Soil temperature must be 15 to 32°C (59°F and 89.6°F) at a depth of 3.2 inches (8 cm). Water immediately after application until soil is wet to a depth of 3.2 to 4 inches (8 to 10 cm). Best results will be obtained if area is covered with plastic for 48 to 72 hours after application.

On light or medium textured well drained soils, which are not wet or cold following application, planting may take place 21 days following treatment. On heavy or high organic matter soils, or soils which remain wet or cold (below 15°C (59°F)) an interval of 30 days should be observed. At rates above 2 L/204 square feet (19 square metres) wait at least 60 days. Frequent shallow cultivation may aid the escape of Vapam. If doubt exists regarding residue of Vapam, transplant a few seedling plants and examine for injury before planting crop.

Vorlex (1150 g/L) Apply 91.1 to 182.1 L/acre for non-organic soils or 141.7 to 364.2 L/acre for organic soils, using injection type applicators. For improved weed control, apply Vorlex to a 4 inch (10 cm) depth and cover with a tarp for four days. Do not fumigate dry soils.

Fumigation period

After application at soil temperatures of 15°C (59°F) or above, keep soil moist and undisturbed for a minimum of four days; seven days is preferable. Colder soils require a longer fumigation period.

Aeration period

Do not use soil when odour of fumigant is still detectable. For soil temperatures of 15°C (59°F) or above and to a depth of 6 inches (15 cm), aerate soil by cultivation after the fumigation period to aid aeration. For colder temperatures, extended rainfall and heavier soils refer to the product label for aeration directions. Follow label directions.

PRECAUTIONS:

- Do not add fertilizers containing ammonia salts or undecomposed manure to the soil at or near the time of fumigation.
- Use only fertilizers containing nitrates until soil temperature is above 18°C (64.4°F) and crop is well established.
- Do not allow liquid or vapours to come in contact with lawn or desirable plants.
- Do not use in greenhouses which contain living plants.
- Avoid contamination of treated soil with untreated soil, transplants, or contaminated tools.
- Vorlex may be corrosive in certain conditions. Rinse all applicators and equipment with fuel oil or kerosene immediately after use. DO NOT USE WATER.
- Vorlex must be stored apart from lodgings for humans, animal quarters, food storage, and normal working areas.

Vegetation Management

Vegetation on storage areas, public works yards, parking lots, fence-lines, roadsides, drainage ditches, railway and hydro rights-of-way, create many problems for the owner. Weed control in these areas gives a well-kept appearance to the property. Herbicides to be considered for these types of weed problems include Contact Chemicals, Systematic Chemicals and Soil Sterilants.

Product Amounts for Small Areas

Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendations.

For a 1076 sq ft (100 m²) Area

To convert from L/acre to mL/1076 sq ft (100 m²), multiply by 25. Eg. 2.5 L/acre — use 62.5 mL per 1076 sq ft (100 m²)

A spray volume of 5 to 10 L/1076 sq ft (100 m²) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre.

Contact Chemicals

Non-selective contact chemicals such as Gramoxone burn the sprayed foliage. Consider this chemical for vegetation control on slopes and on bottoms of drainage or road ditches, where roots are required for stabilization; in residential areas under fence-lines; around poles; in back-lane and parking areas, to ensure the safety of trees and shrubs.

Spray when weed or grass growth has reached a height of about 6 inches (15 cm). Thorough coverage with the spray is essential as it destroys only the sprayed plant parts. Annual weeds are killed, but perennial weeds and grass will regrow and a second spraying may be required for satisfactory control. There is no residual effect from this chemical as it is inactivated by the clay particles of the soil.

Postemergence

Gramoxone (200 g/L) Controls annual grasses and broadleaf weeds and top growth of perennial weeds. Apply 4.45 L/acre or 75 mL in 10 L water/1076 square feet (100 square metres).

Systemic Chemicals

Selective

Where perennial broadleaved weeds exist it may be desirable to eliminate them and allow the grass to persist. Systemic chemicals such as 2,4-D, MCPA, Banvel mixtures and Tordon move throughout the plants when sprayed on the foliage. Thorough wetting of the foliage is essential for good control. For rates of these herbicides required to control specific weeds refer to appropriate sections of this publication.

Non-Selective

Chemicals listed in this section must be applied to foliage of plants which are well established and actively growing so that movement into the root system takes place. This movement is necessary to control the root systems of perennial plants.

Do not cultivate prior to application. Suggested waiting periods after application for cultivation should be observed to allow sufficient time for movement in the plants to take place. This period should be extended during periods of cold or dry weather.

Do not allow spray drift to contact desirable vegetation as severe injury or destruction may occur.

Allizol (95%) Controls annual and perennial grasses and broadleaf weeds. Apply 1.72 kg/acre product in 405 L/acre water. Spray when most weeds are 6 to 10 inches (15 to 25 cm) tall. Follow manufacturer's directions carefully.

Amitrol-T (200 g/L) Controls annual and perennial grass and broadleaf weeds. Apply 8.9 to 14.2 L/acre in 405 L/acre water. Use the higher rate during periods of cool or dry weather. Follow manufacturer's directions carefully. Do not apply after October 1.

Roundup (356 g/L) Controls annual and perennial grass and broadleaf weeds. Apply 1.82 to 4.86 L/acre in 45 L/acre water. Refer to label instructions for rates for specific weeds. There is no residual effect from this chemical. Spray coverage should be uniform and complete. Do not spray to the point of runoff. Refer to *Herbicide Information* section for specific application instruction.

Soil Sterilants

The use of sterilants is recommended for complete vegetation control in industrial areas, hydro yards, storage areas, parking lots, along fence-lines, railroad balasts, drainage ditches, power poles and towers.

The movement of a sterilant downward and laterally will depend on the solubility of the compound and its absorption to soil particles. Soil sterilants move downward to a greater extent in light textured soils (sandy) than in heavy textured soils (clay) with high organic matter. The degree of movement also depends on the rate and amount of rainfall after application. Do not apply on slopes as surface movement may occur causing damage outside the treated area.

Special Weed Problems

Product Amounts for Small Areas

Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendations.

For a 1076 sq ft (100 m^2) Area

To convert from L/acre to mL/1076 sq ft (100 m^2), multiply by 25. Eg. 2.5 L/acre — use 62.5 mL per 1076 sq ft (100 m^2).

A spray volume of 5 to 10 L/1076 sq ft (100 m^2) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre

This section identifies specific weeds and the herbicide use recommended to give control. Most of the recommendations are for use only on non-cropland. A few specific recommendations may be used on cropland. The crop has been indicated in each case but the user must refer to the particular crop section or the product label for further information on the correct crop stage for spraying and application instructions.

Recommendations for use in field, forage and horticultural crops can be found in the appropriate summary charts. See Tables 1 to 11, 19 and 20.

NOTE:

(A) Amitrol-T This is a non-selective, systemic herbicide. Thoroughly wet the actively growing vegetation. Short term soil sterility will occur if excessive herbicide contacts the ground. Direct spray onto the weed to avoid excessive ground application.

(B) Tordon 22 K This is a systemic herbicide effective for control of broadleaf weed and tree species. It can be used to control biennials and deep-rooted perennials on rangeland, grass pastures, cropland and non-cropland. *It is recommended as a spot treatment only*. Tordon 22 K is extremely active, highly soluble in water with residues that persist in treated soil for several years. Follow directions carefully. It is only to be applied by authorized applicator.

Baby's Breath (perennial)

Banvel (480 g/L) DyCleer (400 g/L) Apply 3.7 L/acre Banvel or 4.45 L/acre DyCleer in 45 to 90 L/acre water when actively growing.

Black Medick

Compitox (150 g/L) Apply 4.45 L/acre in 120 L/acre water.

Bladder Campion

Lexone DF (75%), Lexone L (480 g/L), Sencor 500 (500 g/L), Sencor DF (75%) Although not labelled for bladder campion control, results indicate that 0.111 to 0.142 kg/acre Lexone DF or Sencor DF, or 0.172 to 0.223 L/acre Lexone L or Sencor 500 will control bladder campion seedlings at the four to six leaf stage. Both Lexone and Sencor are registered for use in barley and wheat. Check the barley or wheat recommendations for application instructions.

Tordon 22 K (240 g/L) Apply 3.80 L/acre. See Note B.

See Manitoba Agriculture fact sheet *Bladder Campion — A Persistent Perennial* for additional information.

Canada Thistle (on non-cropland)

For recommendations for Canada thistle on cropland see *Perennial Weed Control on Cropland* section.

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water applied at early flowering stage (patch treatment). Use the higher rate during periods of cool or dry weather. Allow three weeks after treatment before disturbing the root system. See Note A.

Banvel (480 g/L), Dycleer (400 g/L), DyCleer 24 (600 g/L) Apply 1.0 L/acre Banvel or 1.21 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water. Apply when thistles are in the early bud stage. Allow three weeks after treatment before disturbing the root system.

Banvel 10 G (10%) For spot treatment only. Apply 22.7 kg/acre product for spot treatment. Use when thistles are in the pre-bud stage. See grazing and feeding instructions Table 15.

Tordon 22 K (240 g/L) Apply 1.82 L/acre in 160 L/acre water from rosette stage in the spring through flowering but before the first heavy frosts in the fall. See Note B.

Roundup (356 g/L) Apply 2.43 L/acre in 45 L/acre water or 75 to 125 ml in 6.5 L water/1076 square feet (100 square metres) when most plants are in the bud to bloom stage. Do not disturb treated plants for at least 10 days following treatment.

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D applied at the early bud stage. Allow three weeks after treatment before disturbing the root system. For product volumes of other 2,4-D formulations refer to Table 14.

Creeping Bellflower

Kil-mor (500 g/L) Apply 0.445 L/acre to suppress growth in the lawn.

Tordon 22 K (240 g/L) Apply 0.445 to 0.75 L/acre. Do not apply near trees. See Note B.

Curled Dock

Banvel (480 g/L) DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 0.92 L/acre Banvel or 1.11 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water to actively growing weeds for top growth control.

MCPA amine, 2,4-D amine Apply 0.445 to 0.69 L/acre of formulations containing 500 g/L MCPA or 2,4-D amine to give top growth control. For product volumes of other MCPA and 2,4-D formulations refer to Table 14.

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre in 45 L/acre water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Cypress Spurge

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine, before the flowering stage. For product volumes of other 2,4-D formulations refer to Table 14.

Dandelions

Kil-mor (500 g/L) Apply 0.68 L/acre in 45 L/acre water.

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine, in 45 L/acre water in early fall. Early spring treatment at this rate is also effective.

Dog Mustard

2,4-D amine Apply 0.69 L/acre of formulations containing 500 g/L 2,4-D amine. May be used on wheat, barley or rye. Apply 0.91 L/acre of the same formulation after harvest to control fall growth. For product volumes of other 2,4-D formulations refer to Table 14.

Field Bindweed

Banvel (480 g/L) DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 1.0 L/acre Banvel or 1.21 L/acre DyCleer or 2.23 L/acre Dycleer 24 in 45 to 90 L/acre water. Apply when field bindweed is in the flowering stage and allow three weeks after treatment before resuming normal summerfallow tillage.

Basagran (480 g/L) Apply 0.71 L/acre plus 0.71 L/acre seven to ten days later. Apply in 90 to 160 L/acre water before field bindweed has developed a dark green color and before it has begun trailing.

Embutox E (400 g/L) Cobutox (400 g/L), 2,4-D Butyric 400 (400 g/L) Apply 1.42 L/acre at the early flowering stage.

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre in 45 L/acre water at the bud stage. Do not disturb plants for at least 10 days following treatment. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Tordon 22 K (240 g/L) Apply 3.64 L/acre. See Note B.

Tropotox Plus (400 g/L) Apply 1.72 L/acre at the early flowering stage.

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine, at early flowering stage. For product volumes of other 2,4-D formulations refer to Table 14.

Field Horsetail

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. Repeat as necessary. See Note A.

MCPA amine, potassium and sodium salt mixtures Apply 0.57 L/acre of formulations containing 500 g/L MCPA, after the weeds have fully emerged for top growth control. May be used in wheat, oats, barley, flax and rye. For product volumes of other MCPA formulations see Table 14.

Foxtail Barley

Gramoxone (200 g/L) Apply 2.23 L/acre in 445 L/acre water or 75 mL in 10 L water/1076 square feet (100 square metres) for top growth control only.

Kerb 50-W (50%) Apply 0.364 to 0.445 kg/acre product in 90 L/acre water between October 1 and freeze-up. Use the lower rate on grey-wooded soils or where perennial bluegrass or fescues are the predominant pasture species. Do not use Kerb 50-W for foxtail barley removal in seed grass stands or desired forage stands of Timothy or fescue grass species. At recommended rates, pasture stands of perennial bluegrass and fescue may be reduced by 10 to 15 per cent. Where perennial bluegrass and fescues are the dominant pasture species, use the lower rate of Kerb 50-W. Spray overlaps may seriously harm desirable pasture grass species. Where foxtail barley comprises most of the grass stand and reseeding to a desirable grass species is desired, delay seeding into the Kerb treated soil until the end of June. Do not harvest or graze within 60 days after application with Kerb 50-W. Avoid using Kerb 50-W on soils having more than 6 per cent organic matter.

Roundup (356 g/L) Apply 1.92 L/acre in 45 L/acre water. Apply in June to actively growing plants. Do not disturb treated plants for at least 10 days following treatment. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Goldenrod

Banvel (480 g/L), DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 0.92 L/acre Banvel or 1.11 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre when the weed is actively growing.

Goat's Beard

Afolan F (450 g/L) plus MCPA Apply 0.19 to 0.25 L/acre Afolan F and 0.445 L/acre of formulations containing 500 g/L MCPA amine when seedlings are in the one to four leaf stage. Use on wheat, barley and oats when the cereal crop is in the two to four leaf stage. For product volumes of other MCPA formulations refer to Table 14.

2,4-D amine or LV ester Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D as early as possible on the second year's growth or in early fall on the first year's growth. For product volumes of other 2,4-D formulations refer to Table 14.

Banvel (480 g/L), DyCleer (400 g/L) and DyCleer 24 (600 g/L) Apply 1.86 L/acre Banvel or 2.23 L/acre DyCleer or use 4.45 L/acre DyCleer 24 in 45 to 90 L/acre water when the weed is actively growing.

Hemp Dogbane

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre when hemp dogbane is in the early bud stage. Apply in 45 L/acre water. Do not disturb treated plants for at least 7 days after application. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

2,4-D amine or LV ester Apply 1.38 to 1.82 L/acre of formulations containing 500 g/L 2,4-D, in fall before frost and while plant leaves are green. For product volumes of other 2,4-D formulations refer to Table 14.

Leafy Spurge

Amitrol-T (200 g/L) Apply 18.2 to 22.3 L/acre in 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

Banvel (480 g/L) DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 0.51 L/acre Banvel or 0.61 L/acre DyCleer or 1.11 L/acre DyCleer 24 in 45 to 90 L/acre water for top growth control when the weed is actively growing.

Tordon 22 K (240 g/L) Apply 3.64 L/acre. See Note B.

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D at early flowering stage. Repeat at least once to new growth later in the season. Control of established plants and new seedlings will require continued applications for a period of at least four to five years. For product volumes of other 2,4-D formulations refer to Table 14.

Milkweed

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water. Apply before flowering (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

Roundup (356 g/L) Apply 4.86 L/acre in 45 L/acre water or 125 mL in 6.5 L water/1076 square feet (100 square metres). Apply when most plants have reached the bud to bloom stage. Reduced results may occur on plants treated after full bloom. As not all milkweed plants reach the required stage of growth at the same time, repeat treatments may be required. Do not disturb plants for 10 days following treatment. Do not apply to plants covered with dirt. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Moss

Copper Sulphate (bluestone) Apply 150 g product in 18 L water/1076 square feet (100 square metres). This treatment is corrosive on metal. To control moss on a roof use Iron Sulphate at the same rate.

Nodding Thistle

2,4-D amine Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D amine in June and re-treat in September. For product volumes of other 2,4-D formulations refer to Table 14.

Poison Ivy

Amitrol-T (200 g/L) Apply 4.45 L/acre in 200 L/acre water. Apply after full leaf has developed but before coloring in the fall. See Note A.

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre in 45 L water after full leaf has developed in spring. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

Other herbicides are registered for control of poison ivy but are not recommended as the above recommendations generally provide more consistent control.

Poverty Weed

Banvel (480 g/L), DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 1.86 L/acre Banvel or 2.23 L/acre DyCleer or 4.45 L/acre DyCleer 24 in 45 to 90 L/acre water when weed is actively growing. Banvel at 0.61 L/acre or DyCleer 24 at 1.11 L/acre will provide only top growth control.

Embutox E (400 g/L) Cobutox (400 g/L), 2,4-D Butyric 400 (400 g/L) Apply 1.42 L/acre on barley and wheat, when the shoots of the weeds are 1 to 3 inches (2.5 to 7.5 cm) high. In a two year rotation of cereal and summerfallow, apply Embutox E to the weeds in the crop. Commence tillage immediately after harvest and continue whenever regrowth occurs throughout the summerfallow year. Repeat the rotation.

2,4-D LV ester Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D to gradually reduce the stand of poverty weed. Spot treatments for at least five years may be required to reduce the stand to a point of eradication. For product volumes of other 2,4-D formulations see Table 14.

Red Bartsia

2,4-D amine or LV ester Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water. On hayland treat within 10 days after first cutting. Roadsides and pastures should be sprayed as soon as the red bartsia appears, usually in early July. Re-treat if necessary for later germination. For product volumes of other 2,4-D formulations refer to Table 14.

Round-leaved Mallow

2,4-D LV ester, Bromox 720 M, Buctril M, Kil-mor, Estaprop Apply at the highest rate recommended for crops tolerant to the herbicide used. Apply at the two to four leaf stage of weed growth.

Scentless Chamomile

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L)
Apply:

Bromox 720 M/Sabre	0.316 L/acre
Buctril M	0.405 L/acre

Apply at the two to six leaf stage of weed growth to control seedlings. May be used on wheat, oats, barley and flax. Control may not be as good in flax because of the lack of good crop competition to suppress further weed growth.

Banvel (480 g/L), DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 0.51 L/acre Banvel or 0.61 L/acre DyCleer or 1.11 L/acre DyCleer 24 in 45 to 90 L/acre water to actively growing weeds for top growth control.

Lontrel (200 g/L) Apply 0.405 to 0.61 L/acre in 45 to 60 L/acre of water. May only be used in rapeseed. Apply at the 3 to 6 leaf stage of the crop.

Pardner (280 g/L) plus MCPA, Torch DS (450 g/L) plus MCPA Apply 0.41 L/acre Pardner or 0.253 L/acre Torch DS plus 0.227 L/acre of formulations containing 500 g/L MCPA in 45 L/acre water when the seedlings are at the two to six leaf stage of growth. For product volumes of other MCPA formulations refer to Table 14.

Tordon 22 K (240 g/L) Apply 0.445 L/acre to control established plants. See Note B.

Snow on the Mountain

2,4-D amine Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D amine in June and re-treat when necessary. For product volumes of other 2,4-D formulations refer to Table 14.

Sow-Thistle (on non-cropland)

For recommendations for perennial sow thistle control on cropland see *Perennial Weed Control on Cropland* section.

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water at flowering stage (patch treatment). Use the higher rate during periods of cool or dry weather. Allow three weeks after treatment before disturbing the root system. See Note A.

Banvel (480 g/L) DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 1.0 L/acre Banvel or 1.21 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water when thistles are in the early bud stage. Allow three weeks after treatment before disturbing the root system.

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre in 45 L/acre water when most plants have reached early bud stage of growth. Allow seven or more days after application before disturbing the root system. Heavy rainfall within two hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

2,4-D amine Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine at early bud stage. For product volumes for other 2,4-D formulations see Table 14. Allow three weeks after treatment before disturbing the root system.

Tordon 22 K (240 g/L) Apply 1.82 L/acre in 160 L/acre water. See Note B.

Stinging Nettle

2,4-D amine Apply 0.91 to 1.82 L/acre of formulations containing 500 g/L 2,4-D amine. For product volumes of other 2,4-D formulations see Table 14.

Stork's-bill

Estaprop (600 g/L) Apply 0.71 L/acre when weeds are at the two to four leaf stage. May be used on wheat or barley.

Tansy

Tordon 22 K (240 g/L) Apply 3.64 L/acre. See Note B.

Tansy Ragwort

Banvel (480 g/L), DyCleer (400 g/L), DyCleer 24 (600 g/L) Apply 0.92 L/acre Banvel or 1.11 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water when weeds are actively growing.

2,4-D Apply 1.13 L/acre of formulations containing 500 g/L 2,4-D. For product volumes of other 2,4-D formulations refer to Table 14.

Toadflax

Amitrol-T (200 g/L) Apply 8.9 to 14.2 L/acre in 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

Roundup (356 g/L) Apply 2.83 to 4.86 L/acre when most plants have reached the early bud stage of growth. Allow seven or more days after application before tillage. See *Herbicide Information* section for specific application instructions.

Tordon 22 K (240 g/L) Apply 3.64 L/acre. See Note B.

2,4-D Apply 1.82 to 3.64 L/acre of formulations containing 500 g/L 2,4-D repeated annually to reduce infestation. For product volumes of other 2,4-D formulations refer to Table 14.

Vipers Bugloss

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Apply 0.405 L/acre Buctril M or 0.316 L/acre of Bromox 720 M or Sabre. May be used on wheat, oats, barley or flax.

Swamp and Water Smartweed

Amitrol-T (200 g/L) Apply 4.45 to 9.31 L/acre in 200 L/acre water. Use the higher rate during periods of cool or dry weather.

Banvel (480 g/L) Apply 1.0 L/acre in 225 L/acre water.

White Cockle

Banvel (480 g/L) plus MCPA amine or potassium salt or 2,4-D amine To control seedlings apply a tank mix of 0.118 L/acre Banvel plus 0.34 L/acre of formulations containing 500 g/L 2,4-D or MCPA. For product volumes of other MCPA and 2,4-D formulations refer to Table 14.

Mecoprop (150 g/L) Apply 2.23 L/acre in 90 L/acre water for top growth control of "established plants". Will also control seedlings. For use in barley, oats, and wheat. Consult the product label for further information.

Yarrow

Is resistant to 2,4-D. Timely mowing will assist in starving the root system and will prevent seed set.

NOTE:

(A) Amitrol-T This is a non-selective, systemic herbicide. Thoroughly wet the actively growing vegetation. Short term soil sterility will occur if excessive herbicide contacts the ground. Direct spray onto the weed to avoid excessive ground application.

(B) Tordon 22 K This is a systemic herbicide effective for control of broadleaf weed and tree species. It can be used to control biennials and deep-rooted perennials on rangeland, grass pastures, cropland and non-cropland. *It is recommended as a spot treatment only.* Tordon 22 K is extremely active, highly soluble in water with residues that persist in treated soil for several years. Follow directions carefully. It is only to be applied by authorized applicator.

Poisonous Weeds

Many well known plants contain poisonous substances that will cause death or severe reactions if ingested by humans or animals. House plants such as dumbcane *(Dieffenbachia sp.)* ornamental shrubs such as Oleander, garden plants such as the leaf of rhubarb, or beans of the castor bean, an ornamental plant are a few examples.

Some agronomic crops may become poisonous at certain stages of growth or when subjected to adverse growing conditions such as frost. Volunteer grain plants that are frozen can be quite toxic to livestock because of high levels of nitrate that accumulates in the frozen plant. The same effect can occur with annual weed species such as pigweed, lamb's-quarters and mustard.

Many poisonous plants are unpalatable to livestock in their natural state. However, they may become quite palatable when sprayed with a herbicide for control of the problem weed.

CAUTION: *When poisonous plants are being sprayed, keep livestock away from the treated area for at least one week.*

Arrow Grass

Eradication is impractical. Fence off large patches. 2,4-D has given good results in preliminary trials.

Death Camus

2,4-D Apply 2.71 L/acre of formulations containing 500 g/L 2,4-D when plants are in early bud stage. Retreat second and third year as necessary. For product volumes of other 2,4-D formulations refer to Table 14.

Locoweeds and Milk Vetches

2,4-D Apply 1.82 to 2.71 L/acre of formulations containing 500 g/L 2,4-D when plants are in full bloom stage. Re-treatment is necessary. For product volumes of other 2,4-D formulations see Table 14.

Water Hemlock

2,4-D Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D, from early growth to early bud stage. Thorough coverage is essential. Re-treatment may be necessary. For product volumes of other 2,4-D formulations see Table 14.

Western Snowberry (buckbrush), Wolf Willow

Banvel (480 g/L) or DyCleer (400 g/L), plus 2,4-D amine or LV ester, DyCleer 24 (600 g/L) Apply 0.84 L/acre Banvel or DyCleer, tank mixed with 1.82 L/acre of formulations containing 500 g/L 2,4-D, or 2.02 L/acre DyCleer 24 in 405 L/acre water. For product volumes of other 2,4-D formulations refer to Table 14.

2,4-D Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D, in not less than 90 L/acre water with ground equipment. For product volumes of other 2,4-D formulations refer to Table 14.

2,4-D LV Ester Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D, in 15 to 27 L/acre diesel oil for application by aircraft. Treat at full leaf stage. Apply between June 15 to July 15 before abscission layer is formed. Good spray coverage is essential. Retreatment may be necessary the following year. For product volumes of other 2,4-D formulations refer to Table 14.

Product Amounts for Smaller Areas

Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendation.

For a 1076 ft^2 area

To convert from L/acre to mL/1076 square feet (100 m^2), multiply by 25.

eg. 2.5 L/ha — use 62.5 mL per 1076 square feet (100 m^2)

A spray volume of 5 to 10 L/1076 square feet (100 m^2) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre.

Volunteer Crop Control

Volunteer crops must be considered as weed problems since they interfere with production of the intended crop, leading to reduced yields.

Good management practices, including proper combine adjustment and timely tillage will reduce the incidence of volunteer crop problems. Herbicides can be used to aid in the control of volunteer crops. Since herbicide availability is limited, crop rotation is an important factor to consider in a program of volunteer crop control.

Herbicides may not be specifically registered for volunteer crop control. Field experience has indicated that the following recommendations will usually give adequate control of the crops listed. At no time should a herbicide be applied to a crop to control a volunteer problem unless the use of the herbicide on the crop is registered for control of other weeds.

CAUTION: *Always adhere to registered use patterns relative to rate, stage and use restrictions.*

Buckwheat, tame

Bromox 720 M, Buctril M, Sabre, Pardner plus 2,4-D, Pardner plus MCPA, Torch DS plus 2,4-D, Torch DS plus MCPA Apply at rates recommended for use in cereal grains or flax. Apply at the two to four leaf stage of volunteer buckwheat.

Cereal Grains, (wheat, barley, rye, spring seedlings of winter cereals)

Eptam Apply as recommended for use in beans, flax, potatoes, sunflowers, sugar beets and alfalfa. Control of barley is not as consistent as other cereals.

Poast Apply as recommended for use in flax, rapeseed (Canola), soybeans, sugar beets or triazine tolerant Canola for control of volunteer cereal grains in the one to six leaf stage.

Roundup (356 g/L) Apply 0.445 L/acre plus 0.142 L/acre of a non-ionic surfactant in 45 L/acre water. Application should be made just prior to seeding, or after seeding but before crop emergence. Use clear water as reduced weed control may occur if water containing soil particles is used.

Sweep Apply 0.91 L/acre in 45 L/acre water prior to seeding or after seeding but prior to crop emergence, when the cereals are in the two to four leaf stage.

Cereal Grains (tame oats)

Use wild oat herbicides as recommended.

Corn

Hoe-Grass Apply at rates recommended for use in cereal crops, other field crops or forages. Apply when corn is 6 to 10 inches (15 to 25 cm) high. Thorough coverage of all corn plants is required. Corn growing in clumps may be difficult to control.

Hoe-Grass II Apply at rates recommended for use in cereal crops and flax. Apply when corn is 6 to 10 inches (15 to 25 cm) high. Thorough coverage of all corn plants is required. Corn growing in clumps may be difficult to control.

Poast Apply at 0.324 to 0.405 L/acre for control of volunteer corn in flax, rapeseed (Canola), soybeans, sugar beets or triazine tolerant Canola. Apply when corn is in the one to six leaf stage.

Flax (suppression only)

Banvel plus 2,4-D, Kil-mor Apply at rates recommended for use in cereal grains. Apply when flax is in the seedling stage.

2,4-D LV Ester Apply 0.69 L/acre of formulations containing 500 g/L 2,4-D as recommended for use in wheat, barley or rye. Apply when flax is in the seedling stage. For product volumes of other 2,4-D formulations refer to Table 14.

Mustard, Rapeseed (including Canola)

Afolan F plus MCPA amine or Lorox L plus MCPA amine. Apply at rates recommended for use in cereal grains. Apply at the two to four leaf stage of mustard and rapeseed.

Banvel plus MCPA, Banvel plus 2,4-D, Kil-mor, DyVel Apply at rates recommended for use in cereal grains. Apply at the two to four leaf stage of mustard or rapeseed.

Bladex L, Bladex TTC Apply at rates recommended in triazine tolerant canola (OAC Triton only) for control of volunteer rapeseed. Apply at the one to four leaf stage of the volunteer rapeseed.

Bromox 720 M, Buctril M, Sabre, Pardner plus 2,4-D, Pardner plus MCPA, Torch DS plus 2,4-D, Torch DS plus MCPA Apply at rates recommended for use in cereal grains or flax. Apply at the two to four leaf stage of mustard or rapeseed.

Lexone, Sencor Apply at rates recommended for use in cereal crops. Apply at the two to four leaf stage of mustard or rapeseed (except for triazine tolerant canola).

MCPA amine, potassium and sodium salt mixtures or ester Apply 0.69 L/acre of formulations containing 500 g/L MCPA to cereal grains or flax. Apply when mustard or rapeseed is in the two to four leaf stage. For product volumes of other MCPA formulations refer to Table 14.

Sencor 500F or Sencor 75DF Controls volunteer rapeseed in triazine tolerant canola (OAC Triton). Apply Sencor 500F as a pre-plant incorporated treatment with Treflan EC, or either Sencor 500F or Sencor 75DF as a post-emergence treatment when the volunteer rapeseed is in the two to four leaf stage.

Stampede CM For control of rapeseed only, apply at rates recommended for use in cereal crops. Apply at the one to four leaf stage of mustard or rapeseed.

2,4-D amine or LV ester Apply 0.69 L/acre of formulations containing 500 g/L 2,4-D to wheat barley or rye. Apply when mustard or rapeseed is in the two to four leaf stage. For product volumes of other 2,4-D formulations see Table 14.

Sunflowers

Banvel plus MCPA, Banvel plus 2,4-D, DyVel, Kilmor Apply at rates recommended for use in cereal grains. Apply at the two to four leaf stage of sunflowers.

Bromox 720 M, Buctril M or Sabre Apply at rates recommended for use in cereal grains or flax. Apply at the two to four leaf stage of sunflowers.

Pardner plus 2,4-D, Pardner plus MCPA, Torch DS plus 2,4-D, Torch DS plus MCPA Apply at rates recommended for use in cereal grains or flax. Apply at the two to four leaf stage of sunflowers.

Volunteer Cereals, Tame Buckwheat, Mustard, Rapeseed

Atrazine Apply as recommended for use in corn. Several formulations are available.

Desiccation

Desiccation is the chemically accelerated drying of plants. It results in the destruction of all plant parts covered by the chemical. It facilitates the harvesting of plants that are cultivated for seeds, fruits, or tubers where the survival of leaves and stems after harvest is of no importance. Harvesting is made easier by the removal of unwanted foliage and weeds. Desiccation of a crop does not speed up maturity but will reduce the time from maturity to harvest.

Alfalfa, Birdsfoot Trefoil, Red Clover

Reglone (200 g/L) Apply 0.81 to 1.32 L/acre in 90 to 220 L/acre water with ground equipment or 25 to 45 L/acre with aircraft. To prevent seed pods from shattering and subsequent loss of seed the interval between spraying and harvest should not exceed seven days. To improve the treatment effectiveness, Agral 90 should be added at the rate of 1 L/1000 L spray mixture.

Do not apply Reglone if a residual herbicide such as Princep Nine-T, Simadex, Simazine or Sinbar has been used on the legume stand within the previous 12 months.

NOTE: There are no restrictions for feeding forage treated with Reglone to animals.

Adzuki Beans, Dry Beans (Navy, White and Red-Kidney) and Soybeans

Reglone (200 g/L) Apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. In heavy stands or in fields which contain weeds apply 1.11 L/acre in at least 25 L/acre water. Apply by means of a fixed wing aircraft fitted to apply a uniform spray coverage. Time the spray application to coincide with 80 to 90 per cent natural leaf defoliation of bean plants. Desiccation of weeds is completed in a week.

To provide more uniform coverage, add Agral 90 at a rate of 1 L/1000 L of spray mixture

Field Peas

Reglone (200 g/L) Apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. In heavy stands or in fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply by means of a fixed winged aircraft fitted to apply uniform spray coverage. Spray when the crop has reached maturity. This treatment does not mature peas. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

Flax

Reglone (200 g/L) Apply 0.81 L/acre in at least 20 L/acre water in light stands or in fields free from weeds. For heavy stands or fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply with a fixed wing aircraft fitted to apply a uniform spray coverage. Spray when flax has fewer than 25 per cent green bolls (normal swathing time). Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

Mustard

Reglone (200 g/L) Apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. In heavy stands or in fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply by means of a fixed winged aircraft fitted to apply uniform spray coverage. Spray when the crop is at the 55 to 75 per cent seed turn (green to brown) stage. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

Rapeseed (including Canola)

Reglone (200 g/L) Apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. Apply 1.11 L/acre in 20 L/acre water in heavy stands or in fields which contain weeds. Use a fixed winged aircraft fitted to apply uniform spray coverage. Spray when the crop is at the 60 to 75 per cent seed turn (green to brown) stage. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation. Do not direct combine Argentine varieties. Wait three days after spraying, then swath.

Sunflowers

Reglone (200 g/L) Apply 0.61 L/acre in 20 L/acre water. Spray when the back of the heads turn yellow and the bracts have started to turn from green to yellow. Seed moisture should be less than 40 per cent. Apply by means of a fixed winged aircraft fitted to apply a uniform spray coverage. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for more uniform coverage.

Potatoes

Reglone (200 g/L) *Ground application:* For heavy top growth or weedy field apply 1.72 L/acre. For light top growth and little weed growth apply 1.11 L/acre.

For mature top growth (little or no weed growth) apply 0.81 L/acre with Agral 90 added at the rate of 1 L/1000 L spray solution. Apply with a boom sprayer using at least 225 to 450 L/acre water.

Aircraft application: Apply 0.91 to 1.11 L/acre in at least 20 L/acre water followed by a second application 4 to 5 days later of 0.61 L/acre in at least 20 L/acre water. Use a fixed winged aircraft fitted to apply uniform spray coverage.

NOTE: Browning of the vascular ring of potato tubers sometimes occurs after the use of vine killers. Do not spray exposed tubers.

Aerial Application

Application Requirements and Recommendations:

- Do not spray in winds above 15 km/h (9 mph). Within ½ hour of sunrise or sunset, do not spray in winds above 10 km/h (6 mph).
- Do not use nozzle pressures above 30 psi (200 kPa) except where specified for the product being applied.
- Avoid spraying when the relative humidity is below 40 per cent.
- Mount nozzles to direct spray horizontally towards the rear of the plane.
- To apply higher volumes use larger nozzles instead of adding more nozzles of the same size.
- Do not spray when the wind is blowing towards a nearby sensitive crop, garden or shelterbelt.
- Do not spray in a dead calm near sensitive plants.
- Except when applying Avadex BW granules, fly at a height of 3 to 6 feet (1 to 2 metres) from the wheels to the crop, or as low as conditions permit for safe operation.
- Shut off spray before pulling up over trees, powerlines or other obstructions. Make sure equipment is kept clean and that all nozzle shutoffs are working properly at all times.
- Use water as a carrier rather than oil, to avoid crop injury.

The herbicides included in Table 12 can be applied by air. For liquids a minimum water volume of 15 L/acre is recommended to reduce drift damage. For flax use a minimum water volume of 25 L/acre.

TABLE 12. AERIAL RECOMMENDATIONS FOR FIELD CROPS

	Cereals															
	Barley	Oats	Rye	Triticale	Wheat	Canary Seed	Faba beans	Flax	Forage Grasses	Forage Legumes	Lentils	Mustard	Peas	Rapeseed[f]	Sugar beets	Sunflowers
Avadex BW Granular	X				X			X		X		X		X	X	
Avenge 200-C	X				X[c]	X			X	X						
Banvel	X	X	X		X											
Bromox 720 M, Buctril M, Sabre	X	X			X	X[d]		X[d]								
Hoe-Grass 284	X[b]				X			X						X		
Mataven/Mataven L				X	X	X			X	X						X
MCPA amine (including Aeromin), MCPAK	X	X	X[a]		X			X								
Poast								X						X	X	
2,4-D amine (including Aeromin)	X		X		X				X[e]							

[a] MCPA amine only

[b] Do not use Hoe-Grass on Norbert, Klages, Betzes or Glenn barley

[c] Avenge 200-C may be used on Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa and Selkirk wheat only

[d] Use Bromox 720 M or Sabre only

[e] Use WEEDAR 80 (2,4-D amine) only

[f] Including triazine tolerant canola.

CAUTION: *Take all possible precautions to prevent drift damage to susceptible crops, shelterbelts, gardens and yard areas.*

Liquids (Aerial application)

Avenge 200-C (200 g/L) Controls wild oats. For barley, canary seed and wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa, and Selkirk wheat only) and the following seedling forages when underseeded to wheat or barley — alfalfa, birdsfoot trefoil, red and sweet clover, creeping red fescue, meadow fescue, bromegrass, timothy, crested wheatgrass, orchardgrass, Russian wild ryegrass, reed canarygrass and Kentucky bluegrass. Apply 1.42 to 1.72 L/acre in 8 to 20 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants/square metre).

Apply when wild oats are in the three to five leaf stage. Do not apply when wind exceeds 15 km/h (9 mph). Make application as close to the growing crop as possible. For tank mixing with broadleaf herbicides, choose only those products registered for aerial application and refer to the label of the broadleaf herbicide. Do not graze or feed treated cereal crops to livestock for eight weeks after application. Do not graze or harvest treated forage grasses or legumes for forage during the year of treatment.

Banvel (480 g/L) Controls several broadleaf weeds. See *Field Crops Chart.* Banvel can be applied to barley, oats, rye and wheat. Apply Banvel alone at 0.093 L/acre or tank mix with the amine or potassium formulations of MCPA or the amine formulation of 2,4-D at 0.344 L/acre of the 500 g/L formulations of MCPA or 2,4-D. Apply in not less than 8.1 L/acre water. Banvel should be applied at the two to three leaf stage of crop growth. Do not spray when winds are above 15 kph (9 mph) or when wind is blowing towards nearby sensitive crops, gardens or shelter-belts. Do not mix Banvel with any spray additives.

Bromox 720 M (720 g/L), Buctril M (560 g/L), Sabre (720 g/L) Controls several broadleaf weeds in barley, oats, wheat, flax and canary seed. Do not apply Buctril M by air to canaryseed or flax. See *Field Crops Chart.*

Apply:

Bromox 720 M	0.316 L/acre
Buctrim M	0.405 L/acre
Sabre	0.316 L/acre

Apply in at least 8 L/acre water. These products are contact herbicides, therefore thorough coverage of weeds is important. A water volume of 16 to 20 L/acre is preferred. Swath width must not exceed length of the spray boom.

Apply when weeds are in the two to four leaf stage and before the crop shields the weeds. Canary seed should be treated in the three to five leaf stage, flax when 2 to 4 inches (5 to 10 cm) tall. Barley, oats and wheat can be safely treated until the early shot blade stage but weeds will not be adequately controlled once the crop shields the weeds.

These treatments will give some top growth control of Canada thistle and perennial sow thistle but regrowth can be expected.

On flax there may be some leaf burn and a delay in maturity of two or three days. Do not spray in hot, humid weather conditions.

Hoe-Grass 284 (284g/L) Controls barnyard grass, green and yellow foxtail and wild oats. For wheat, barley, (except Klages, Norbert, Glenn and Betzes) rapeseed and flax apply at 1.01 L/acre. For all crops, apply in no less than 15 L/acre water at a pressure of no less than 45 psi (300 kPa). Apply when the grassy weeds are in the one to four leaf stage and before tillering.

Hoe-Grass 284 must be applied in the one to four leaf stage of barley and before tillering (stooling). Application beyond this stage will result in crop damage. Certain environmental conditions should be avoided when applying Hoe-Grass 284 on barley, i.e. prolonged cool, humid periods, drought and frost.

Do not tank mix Hoe-Grass 284 with any herbicide (for example, Pardner, Torch, 2,4-D, MCPA) as crop damage and reduced grassy weed control will result. Herbicides for the control of broadleaf weeds must be applied at least four days after the application of Hoe-Grass.

Do not tank mix Hoe-Grass 284 with any herbicide, insecticide, fungicide, fertilizer or chemical additive. Do not use raindrop nozzles. Avoid application if rain is expected within one hour.

Do not spray Hoe-Grass 284 if the wind speed is more than 13 km/h (8 mph).

Mataven (84 g/L), Mataven L (52.5 g/L) Controls wild oats in wheat, triticale, canary seed, sunflowers and the following seedling forages — alfalfa, bromegrass, meadow fescue, creeping red fescue, Russian wild ryegrass, intermediate wheatgrass and crested wheatgrass. Use only on varieties recommended for production in Manitoba. See *1986 Field Crop Variety Recommendations.* Mataven (84 g/L) can also be applied for wild oat control in red clover, birdsfoot trefoil, sainfoin and cicer milk vetch. Use only on forage stands grown for seed production. Apply 2.02 L/acre except on forage grasses grown without a companion crop where a rate of 3.04 L/acre should be used. Use a total spray volume of not less than 8 L/acre. Apply when wild oats are in the three to six leaf stage and before the crop is past the six leaf stage.

MCPA amine (barley, oats, wheat) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA when the crop is in the two leaf to early shot blade stage. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed and flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA amine formulations see Table 14.

MCPA amine (Flax) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 25 L/acre water. Apply MCPA from the time flax is 2 inches (5 cm) tall until just before bud stage. Some delay in maturity and crop injury may result from use of the higher rates but will most often be more than offset by increased yields, if the infestation of susceptible weeds is moderate to high. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA amine formulation see Table 14.

MCPA amine, 2,4-D amine (Rye, spring or fall) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA or 2,4-D. Apply MCPA when spring rye is in the two leaf to early shot blade stage, or when fall rye commences growth in the spring, until the early shot blade stage. Apply 2,4-D from the four leaf to early shot blade stage. Only a few brands of 2,4-D are registered for application in the fall. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA or 2,4-D. For product volumes of other MCPA and 2,4-D formulations see Table 14.

Poast (184 g/L) Controls several grassy weeds in flax, rapeseed (Canola), soybeans and sugar beets. See *Field Crops Chart.* Apply 0.324 to 0.405 L/acre for control of green and yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn, 0.57 to 0.65 L/acre for control of wild oats; 0.65 L/acre for control of volunteer wheat and volunteer oats; or 0.77 L/acre for control of volunteer barley. Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply in 10 to 20 L/acre of water at a minimum nozzle pressure of 275 kPa (40 psi). Add 0.304 to 0.405 L/acre of Assist Oil Concentrate. Apply when weeds are in the one to six leaf stage with the majority in the two to five leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding, or prolonged cool conditions (15°C, 59°F or less). Do not tank mix with other herbicides. Allow a four day interval between application of Poast and other herbicides.

CAUTION: *Cereal crops, corn, and forage grasses are* ***extremely sensitive*** *to Poast drift. Do not apply if the wind is blowing towards adjacent fields of cereals, corn, or forage grasses. As these crops comprise a major portion of Manitoba's cropped hectarage, opportunities to safely apply Poast by air will be very limited.*

2,4-D amine (barley and wheat) Controls several broadleaf weeds. See *Field Crops Chart.* Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D when the crop is in the four leaf to early shot blade stage. If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L 2,4-D. For product volumes of other 2,4-D amine formulations see Table 14.

MCPAK (400 g/L) Controls hemp nettle and other MCPA susceptible weeds in wheat, oats, barley and flax. See *Field Crops Chart.* Apply at 0.85 L/acre when weeds are in the one to four leaf stage. Some injury to flax or delay in flax maturity may result.

Granular (Aerial application)

Avadex BW Granular (10%) Controls wild oats. Apply at the rates indicated for specific crops. Fly at a height of 29.7 feet (9 m). Incorporate according to instructions in *Herbicide Incorporation* section. The granular formulation is more suited to fall applications than to spring application. Do not apply Avadex BW liquid by air.

Do not seed domestic oats the year after treatment with Avadex BW.

Barley

At 7.08 kg/acre product applied in the fall or before seeding in the spring.

Wheat

At 6.07 kg/acre product applied in the fall.

Flax, mustard, rapeseed, sugar beets

At 7.08 to 9.11 kg/acre product applied in the fall or before seeding in the spring.

For further aerial recommendations see Brush Control and Desiccation sections.

CAUTION: *Take all possible precautions to prevent drift damage to susceptible crops, shelterbelts, gardens and yard areas.*

Herbicide Incorporation

Manitoba Agriculture does not recommend fall application of soil applied herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

Avadex BW (liquid or granular)

The liquid formulation must be incorporated into soil that is free of lumps or trash. The granular formulation may be incorporated into trashy soil and is best suited for fall use. For fall applications of Avadex BW Granular apply and incorporate between September 15 and freeze-up. For spring applications, incorporate after seeding when using the product in wheat and before seeding in all other labelled crops. (Although Avadex BW may be applied and incorporated after seeding in the case of barley, wild oat control is generally less acceptable than when applied before seeding. In wheat, lower rates must be used before seeding to minimize crop injury and consequently wild oat control will be more consistent if Avadex BW is applied after seeding wheat).

Incorporate to a depth of 2 inches (5 cm) by setting disc or cultivator implements to cut 3 inches (7.5 cm) into the soil. Mixing the product to greater depths will dilute the herbicide, decreasing wild oat control, and may cause injury to cereals. Ensure that cereals are seeded below the treated layer (2 to 3 inches; 5 to 7.5 cm). If the herbicide is applied and incorporated after seeding (as in wheat or barley), avoid ridging the soil by incorporating with harrows. For the liquid formulation, cultivate, disc or harrow the chemical into the soil the same day as application. For granular formulations, incorporate as soon as possible but within 48 hours of application. A second incorporation should be performed at right angles to the first. For fall applications, the second incorporation may be delayed until the following spring. For spring applications, the second incorporation may be done immediately or delayed for several days.

Application on granular fertilizer

To apply with dry urea fertilizer, commercial blending is recommended. The liquid formulation of Avadex BW is sprayed onto the urea in a rotary blender. A minimum of 60 kg/acre of dry urea fertilizer must be used. Apply as soon as possible after blending. If a spin spreader is used, 100 per cent overlap is required.

Dual

For incorporation of Dual ensure that the chemical remains in the top 2 inches (5 cm) of soil only. To do so, use (1) tandem discs set to cut to a depth of 4 inches (10 cm) operated at 6 to 10 km/h (5 to 6 mph) or (2) S-tine (Danish) cultivators with tines on 6 to 8 inch (15 to 20 cm) centres set 4 inches (10 cm) deep and operated at 10 to 13 km/h (6 to 7 mph) or vibrating shank cultivators with overlapping sweeps set to cut 4 inches (10 cm) deep followed by a harrow or levelling device which extends beyond the end of the implement. Immediate incorporation is not necessary.

Eptam 8 E or Eptam 10 G

Since Eptam formulations are highly volatile, the product must be incorporated immediately (preferably in the same operation) into a dry soil. This can be accomplished by mounting the spraying equipment onto the incorporation implement. Best results are achieved with use of power-driven cultivation equipment, tandem discs, and field cultivators (on light soils). Set implements to cut to a depth of 4 to 6 inches (10 to 15 cm). Power-driven equipment (rotovators) should be set to cut at 2 to 3 inches (5 to 7.5 cm). Operate discers at 6.5 to 9.5 km/h (4 to 6 mph) and cultivators at 9.5 km/h (6 mph) or more. A second operation at right angles to the first is required when using discs or cultivators. Only one incorporation is necessary when using a rotovator. Incorporation with discs or cultivator should be followed by a harrow or levelling device.

Application on granular fertilizer

Dry bulk fertilizers (except nitrate fertilizers) may be impregnated or coated with Eptam 8-E. The Eptam 8-E should be uniformly spread onto the dry bulk fertilizer during the blending process. A minimum rate of 80 kg/acre of fertilizer is necessary to ensure adequate distribution. The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the soil surface is dry to at least one half inch (1.5 cm) depth. The first incorporation must be done immediately after application.

Eradicane and Sutan+ (also mixes with Aatrex, Atrazine or Bladex)

Since Eradicane and Sutan+ formulations are highly volatile, the product must be incorporated immediately (preferably in the same operation) into a dry soil. This can be accomplished by mounting the spraying equipment onto the incorporation implement. Best results are achieved with use of power-driven cultivation equipment, tandem discs, and field cultivators (on light soils). Set implements to cut to a depth of 4 to 6 inches (10 to 15 cm). Power-driven equipment (rotovators) should be set to cut at 2 to 3 inches (5 to 7.5 cm). Operate discers at 6.5 to 9.5 km/h (4 to 6 mph) and cultivators at 9.5 km/h (6 mph) or more. A second operation at right angles to the first is required when using discs or cultivators. Only one incorporation is necessary when using a rotovator. Incorporation with discs or cultivator should be followed by a harrow or levelling device.

Application on Granular Fertilizer

Dry bulk fertilizers except nitrate fertilizers may be impregnated or coated with Eradicane or Sutan+. The Eradicane or Sutan+ should be uniformly spread onto the dry bulk fertilizer during the blending process. A minimum rate of 80 kg/acre of fertilizer is necessary to ensure adequate distribution. The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the soil surface is dry to at least ½ inch (1.5 cm). The first incorporation must be done immediately after application.

Lasso (also mixes with atrazine)

For incorporation of Lasso ensure that the chemical remains in the top 2 inches (5 cm) of soil only. To do so, use discer equipment set to cut at 3 to 4 inches (7.5 to 10 cm). Operate at 8 to 10 km/h (5 to 6 mph). Incorporation must be made within seven days of application. Incorporation is not required if ¼ to ½ inch (0.8 to 1.8 cm) of rain or irrigation follows within seven days of application. Field cultivators or harrows may be used on lighter soils. If a discer is used follow with harrows.

Nortron

Incorporate Nortron to a depth of 1 to 2 inches (2.5 to 5 cm) using power- or ground-driven rotary tillers, rolling cultivators or harrows. Band application is preferable as carryover into the following season will be reduced. When tank mixed with Ro-Neet, follow instructions for incorporating Ro-Neet in the *Herbicide Incorporation* section.

Primextra

Ensure that Primextra remains in the top 2 inches (5 cm) of soil only. To do so, use (1) tandem discs set to cut to a depth of 4 inches (10 cm) operated at 6 to 10 km/h (5 to 6 mph) or (2) S-tine (Danish) cultivators with tines on 6 to 8 inches (15 to 20 cm) centers set 4 inches (10 cm) deep and operated at 10 to 13 km/h (6 to 7 mph) or vibrating shank cultivators with overlapping sweeps set to cut 4 inches (10 cm) deep operated at 10 to 13 km/h (6 to 7 mph). Follow this operation by a harrow or levelling device which extends beyond the end of the implement. Immediate incorporation is not necessary.

Rival, Rival 10 G, Treflan EC, Treflan QR 5, Triflurex

Post plant but prior to emergence (wheat and barley).

Only the liquid formulations are recommended for use as post planting, preemergence treatments in wheat or barley. Liquids should be applied and incorporated in the spring just after seeding. Incorporate to a shallow depth into a trash free soil (80% black when viewed from above) using diamond or tyne harrows operated at a speed of 8 km/h (5 mph). Incorporate twice, with the second incorporation at right angles to the first. The first incorporation should be performed immediately. Both incorporations should be done within 24 hours of application. When tank mixing Rival or Treflan with Avadex BW, follow the same incorporation procedure as outlined above.

Preplant incorporated (barley and labelled broadleaf crops).

Granular formulations are recommended for use in fall or spring as a preplant incorporated treatment on labelled broadleaf crops. The liquid formulations should be used only on soils free of lumps and relatively trash-free (80% black) and are recommended only for spring use.

Rival 10 G and Treflan QR 5 are registered for use in **fall only** as a preplant incorporated treatment **for barley**.

For fall application of granular formulations, work the chemical into the soil between September 1 and freeze-up. Use a discer or field cultivator (vibrating shank-type). Disc implements are preferred on stubble. Set equipment to cut at 3 to 4 inches (8 to 10 cms) depth for the first incorporations. The initial incorporation should be done within 24 hours of application. The second incorporation should be done at right angles to the first.

The second incorporation may be delayed until spring, except when planning to plant barley, flax or lentils. For use in flax, lentils or barley both incorporations must be done in fall. Delay the second incorporation for three days after the first to achieve better weed control. This will allow greater release of the chemical onto soil particles and assume more even distribution. Fall applications of Rival 10 G or Treflan QR 5 on flax, lentils or barley is not recommended on soils prone to erosion as the two fall incorporations necessary in these crops may leave soils vulnerable to wind or water erosion.

For spring application and incorporation of Rival, Treflan or Triflurex work the chemical into the soil prior to seeding by setting the implement at 3 to 4 inches (8 to 10 cm) cutting depth. The first incorporation must be done within 24 hours of application. The second incorporation must be done at right angles to the first. If incorporating Rival 10 G or Treflan QR 5, delay the second incorporation for three days after the first to achieve better weed control.

Ro-Neet

Thoroughly incorporate Ro-Neet into the soil to a depth of 2 to 3 inches (5 to 7.5 cm) within minutes of application. For broadcast application, use either a hooded power-driven rotovator or a disc implement. Set discs to cut at 4 to 6 inches (10 to 15 cm) depths. Disc twice at right angles. On light soils, disc once and harrow at right angles. For band application, incorporate to 2 to 3 inches (5 to 7.5 cm) using a power- or ground-driven rotary tiller. The treated area should be rolled firmly between the incorporation unit and the planters.

TABLE 13 — PRODUCT REQUIRED FOR VARIOUS ATRAZINE FORMULATIONS

Atrazine recommendations are based on liquid formulations containing 500 g/L atrazine and wettable powder formulations containing 90 percent atrazine. Use the following chart to determine equivalent rates of other formulations.

Metric

		ACTIVE RATE (kg/ac)									
PRODUCT NAME	**CONCENTRATION**	**0.5**	**0.6**	**0.7**	**0.8**	**0.91**	**1.0**	**1.1**	**1.2**	**1.3**	**1.37**
Aatrex Liquid Atrazine Liquid Liquid Atrazine	500 g/L	1.0 L/ac	1.2 L/ac	1.4 L/ac	1.6 L/ac	1.82 L/ac	2.0 L/ac	2.2 L/ac	2.4 L/ac	2.6 L/ac	2.73 L/ac
Aatrex Nine-0 Aatrex 90 W	90%	0.556 kg/ac	0.667 kg/ac	0.777 kg/ac	0.889 kg/ac	1.01 kg/ac	1.1 kg/ac	1.2 kg/ac	1.3 kg/ac	1.4 kg/ac	1.52 kg/ac
Atrazine 80 W	80%	0.625 kg/ac	0.75 kg/ac	0.875 kg/ac	1.0 kg/ac	1.14 kg/ac	1.25 kg/ac	1.38 kg/ac	1.5 kg/ac	1.63 kg/ha	1.71 kg/ac

TABLE 14. PRODUCT VOLUME REQUIRED FOR VARIOUS MCPA or 2,4-D FORMULATIONS

MCPA and 2,4-D recommendations are based on formulations containing 500 g/L MCPA or 2,4-D. Where other concentrations are to be used, locate the volume of 500 g/L formulation recommended and read across to the concentration being used. Do not substitute amine or ester formulations where the other formulation is specified.

Litres per acre (L/acre) unless otherwise indicated.*

Metric

ACTIVE RATE	**CONCENTRATION (g/L)**						
kg/ac	**250**	**300**	**400**	**500**	**600**	**700**	**800**
0.112	0.448	0.373	0.28	0.224	0.187	0.160	0.140
0.141	0.564	0.470	0.353	0.282	0.235	0.202	0.176
0.223	0.892	0.743	0.558	0.446	0.372	0.319	0.279
0.255	1.02	0.850	0.638	0.510	0.425	0.365	0.319
0.305	1.22	1.02	0.763	0.610	0.508	0.436	0.381
0.345	1.38	1.15	0.863	0.690	0.575	0.493	0.431
0.455	1.82	1.52	1.14	0.910	0.758	0.651	0.569
0.5	2.00	1.67	1.25	1.0	0.833	0.715	0.625
0.6	2.4	2.00	1.5	1.2	1.00	0.857	0.75
0.7	2.8	2.33	1.75	1.4	1.17	1.0	0.875
0.8	3.2	2.67	2.0	1.6	1.33	1.14	1.0
0.91	3.64	3.03	2.28	1.82	1.52	1.30	1.14
1.0	4.0	3.33	2.5	2.0	1.67	1.43	1.25
1.2	4.8	4.0	3.0	2.4	2.0	1.72	1.5
1.5	6.0	5.0	3.75	3.0	2.5	2.15	1.875
1.82	7.28	6.07	4.55	3.64	3.03	2.60	2.275
2.0	8.0	6.66	5.00	4.00	3.33	2.86	2.5

*1 L/ac = 1000 mL/ac

Liquid Fertilizer Mixes

The mixing of herbicides in liquid fertilizer for application should be carried out only for products which are recommended for this use.

Thorough mixing and even application are required. Accurate calibration should be carried out to ensure the proper rate of herbicide application.

Compatibility of the herbicide in the liquid fertilizer should be tested before the herbicide is added to the tank. All registered products outline this procedure.

The following products can be applied with liquid fertilizer:

Aatrex
Avadex BW
Dual
Eptam
Eradicane 8-E (alone or with Aatrex)
Lasso
Primextra
Rival, Treflan EC, Triflurex
Ro-Neet 7.2E
Sutan (alone or with Aatrex)

TABLE 15. GRAZING AND FEEDING RESTRICTIONS

This table summarizes label restrictions for herbicides recommended for cereal or forage crops. Consult product labels for specific information and for other crops.

PRODUCT	RESTRICTION
Afolan F/Lorox	Do not graze or feed green plants to livestock.
Amitrol T	Do not graze until six months following treatment.
Asulox F	Do not graze or feed treated crop.
Avadex BW	*Cereals* none
	Forage legumes Do not harvest as forage in the year of seeding.
Avenge 200 C	Do not graze or feed cereals for eight weeks after treatment. Do not graze or harvest forage grasses or legumes for forage in the year of treatment.
Banvel	*Cereals* Do not graze or harvest for livestock feed prior to crop maturity.
	Pasture and forages Do not graze or feed *dairy animals* within 7 to 60 days of treatment, depending on rate of Banvel applied. See product label for additional detail. Do not graze or feed *slaughter animals* within 30 days of treatment. Forage harvested within 30 days of treatment should not be fed to slaughter animals within 30 days of slaughter.
	There is no restriction for livestock other than dairy or slaughter animals.
Basagran	None.
Blagal	Do not graze or feed green plants to livestock.
Bromox 720 M/ Buctril M/ Pardner/Sabre/Torch DS	None, except with Torch DS on forages. Do not graze or harvest forage grasses for feed in the year of treatment with Torch DS.
Carbyne	Do not graze or feed crop for five weeks after treatment.
Dowpon/Dalapon/Basfapon	Do not feed first year cuttings to dairy animals or animals being finished for slaughter.
DyVel	Do not graze or harvest for livestock feed prior to crop maturity.
Embutox E/Tropotox/Tropotox Plus/Cobutox/2,4-D Butyric 400	None
Eptam	None
Hoe-Grass 284	Do not graze treated cereal crops. Straw can be used for bedding or feed after harvest of the crop. Do not graze treated forages.
Hoe-Grass II	Do not graze treated fields prior to harvest.
Kerb	Do not harvest or graze within 60 days after application.
Kil-Mor	None

PRODUCT	RESTRICTION
Lexone/Sencor	Do not graze or feed treated cereal crops within 30 days of application, or peas within 70 days after application.
Lontrel	Do not graze or feed crops treated with Lontrel.
Mataven/Mataven L	Do not graze or feed treated wheat before maturity. Straw can be used for bedding or feed after harvest of the crop. Do not graze or harvest forage grasses or legumes for feed in the year of treatment.
MCPA	Do not graze dairy cattle within seven days of spraying.
MCPP	None
Poast	Do not graze treated fields or harvest for feed prior to crop maturity.
Princep Nine-T/Simadex/Simazine	Do not graze for 30 days or cut for hay within 60 days of application.
Reglone	There are no restrictions for feeding forage treated with Reglone to animals.
Rival/Treflan/Triflurex	None
Roundup	Do not graze or harvest treated areas until treated plants have turned brown and started to deteriorate.
Sinbar	None
Stampede/Stampede CM	None
Target	None
TCA	Do not graze treated areas.
Tordon 202 C	Do not feed treated plant material to meat animals being finished for slaughter, or to dairy animals within 14 days of treatment. See label for precautions on use of manure when treated crop is fed.
2,4-D	Do not graze for 24 hours after treatment.

TABLE 16. EFFECT OF RAINFALL ON HERBICIDE EFFICACY

Rainfall shortly after application of a postemergence herbicide may reduce weed control. Effect will vary with the product, the interval between spraying and rainfall and the amount and duration of rainfall. The following guidelines are based on label information and additional detail supplied by the chemical industry. Use the longest time interval when considering tank mixes.

INTERVAL REQUIRED*	PRODUCT	
15 minutes	Carbyne	
1 hour	Buctril M	Cobutox
	Hoe-Grass 284	2,4-D Butyric
	Hoe-Grass II	Embutox E
	Pardner	Estaprop
	Stampede 360	Poast
	Stampede CM	
	TCA	
2 hours	Atrazine	
	Bladex L	
	Bladex TTC	
	Bromox 720 M	
	Mataven	
	Mataven L	
	MCPA ester	
	Sabre	
	Torch DS	
	2,4-D ester	
3 hours	Target	
	Estemine 2,4-D	
	Estemine MCPA	
4 hours	Benazolin	Tropotox Plus
	Blagal	
	MCPA amine	
	2,4-D amine	
6 hours	Avenge 200 C	MCPAK
	Betanex	MCPA Sodium Salt
	Betanal	Roundup
	Kil-Mor	Sencor
	Lexone	Tordon 202 C
	Lontrel	
8 hours	Asulox F	
	Basagran	
	Laddock	
No information provided on the effects of rainfall on herbicide efficacy by the manufacturer. To ensure no reduction in control allow an 8 hour interval between application and rainfall.	Amitrol-T	
	Banvel	
	DyVel	
	Lorox + MCPA	

TABLE 17 — SOIL RESIDUES SUMMARY

Several herbicides recommended for field or forage crops leave a residue in the soil, affecting subsequent crops in the rotation. This table summarizes available information. Product labels provide specific information.

Herbicides applied in the fall or on summerfallow may also leave a residue in the soil (example, high rates of Banvel, Tordon 22 K). Check recommendations or product labels for precautions.

PRODUCT	CROPS WHICH MAY BE AFFECTED THE YEAR FOLLOWING USE OF THE HERBICIDE
Atrazine *(includes all products containing atrazine)*	All crops except corn and triazine tolerant canola. Peas, flax and faba beans have some tolerance to atrazine residues. If rate of application exceeds 0.445 kg/acre active only corn or triazine tolerant canola should be grown the following year. Atrazine residues may persist for more than one year.
Avadex BW	Oats
Bladex / Bladex TTC	All crops except corn, triazine tolerant canola, cereals, potatoes, flax, rapeseed (Canola), sunflowers, soybeans or peas. There is no recropping restriction at the rates recommended for use in triazine tolerant canola.
Glean	If Glean has been used on soils having a pH of 7.5 or less, only wheat may be seeded the year following Glean application. If the soil pH is 7.0 or less either wheat or barley may be seeded the year following the Glean application. Few soils in Manitoba are below pH 7.0. Either wheat or barley may be seeded the second season (22 months or longer) following the last Glean application. Crops other than wheat or barley may be injured by Glean residues 3 or more years following Glean application. These restrictions severely limit cropping opportunities on Glean treated fields.
Lontrel	All crops except wheat, oats, barley, rye, flax and rapeseed. Residual carryover two years after application has not been fully evaluated. Sensitive crops such as sunflowers, pulse crops or small seeded legumes could be affected two or more years after application.
Primextra	All crops except corn and triazine tolerant canola. Primextra contains atrazine. See comment for atrazine.
Princep Nine-T, Simadex, Simazine	All crops except established forage legumes where recommended. Soil residues may persist for two or more years.
Rival / Treflan / Triflurex	Sugar beets, red beets, oats, fall rye, canaryseed, small-seeded grasses. Corn may be sensitive at higher rates of application. Damage to wheat can occur if the crop is seeded into land which has been treated during the previous 21 months with Rival, Treflan or Triflurex and which has received abnormally low amounts of precipitation. Damage is likely to be worse if conditions are not conducive to rapid emergence of the wheat (i.e. if the crop is seeded deep, if soil conditions remain cool during emergence). Damage tends to be greater on fields treated with granular formulations.

PRODUCT	CROPS WHICH MAY BE AFFECTED THE YEAR FOLLOWING USE OF THE HERBICIDE
Sencor / Lexone *(preplant recommendations)*	Rapeseed, sunflowers, sugar beets, onions, celery, peppers, cole crops, lettuce, spinach, red beets, turnips, pumpkin, squash, cucumbers and melons. Fall seeded crops may also be injured when seeded within the same season as the application of Sencor or Lexone.
Sinbar	All crops except established alfalfa as recommended. Sinbar residues may persist for two or more years.
Tordon 202 C	Replant to wheat, barley, oats, flax or rapeseed for two years following treatment. Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Due to the length of the recropping restriction the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.

Winter storage of herbicides

Heated storage

Herbicides which must be kept in heated storage (DO NOT FREEZE)

Agriculture Weedkiller No. 1
Afolan F
Alanap 3
Amiben
Amitrol-T
Amizine
Asulox F
Atra-Mix
Avadex BW Liquid
Avenge 200-C (above 4°C)
Basagran
Benazolin
Betasan
Blagal
Bromox 720 M
Chipman Dandelion Killer
Chipman Lawn Weed Killer
Chipman Premium Lawn Killer
Chloro-IPC
Compitox
Compitox Plus
Co-op Lawn Weed Killer
Co-op Premium Lawn Weed Killer
Co-op Premium Spot Weed Killer
Co-op Premium Turf Herbicide
Dowfume MC 2
Dy-Amine
Dyanap
DyCleer
DyCleer 24
DyVel
Embark
Estemines (2,4-D, MCPA)
Formula 40C
Esteron 600
Esteron LV-600
Esteron 99
Gramoxone
Gramoxone S
Herbicide 273
Hoe Grass 284
Hoe-Grass II
Hyvar XL
Killex
Kil-mor
Laddok
Lasso
Lontrel
Lorox L
Mataven
Mataven L
MCPA - amines, potassium and sodium salts
Mecoprop 300
Mecoturf
Mecoturf Plus 2,4-D
Nortron
Phenoxylene Plus
Prefar
Primatol Liquid
Randox
Reglone
Reglone A
Rival
Ro-Neet 7.2E
Simadex
Sinox PE
Sweep
Target
TCA Solution
Torch DS
Tordon 22K
Tordon 101
Tordon 202C
Totril
Tropotox
Tropotox Plus
2,4-D amine
Weed-No-More

Storage at freezing temperatures

Herbicides which may be stored at freezing temperatures. These must be returned to their original state by warming to room temperature 20 to 22°C (68 to 72°F), and agitating thoroughly before use.

AAtrex Liquid
AAtrex Plus
Atrazine Liquid
Banvel
Betanel
Betanex
Bladex Liquid
Bladex TTC
Buctril M
Carbyne 2 EC
Cobutox
Co-op Atrazine 5L
Desormone 7
Diphenoprop 700
Dual-Ciba-Geigy
Embutox E
Eptam 8-E
Eradicane 8-E
Estaprop
Esters of 2,4-D
MCPA
Lexone L
Pardner
Poast
Primatol Liquid
Primextra
Propaturf
Roundup
Sabre
Sencor 500
Silvaprop
Sutan +
Stampede 360
Stampede CM
Torch DS
Treflan EC
Triflurex
2,4-D Butyric 400
Vapam
(above - 17°C)
Vorlex

Herbicides normally sold as granules or powders: (These are not usually damaged by freezing.) Store in dry place.

AAtrex 90 WP
AAtrex Nine-0
Allizol
Atra-pell
Atrazine 80W
Avadex BW 10G
Banvel 5G
Bar-fox
Basamid
Basfapon
Betasan 12.5G
Bladex 80W
Bluestone
Calmix pellets
Casoron 4G
Co-op Garden Weed Preventer
Co-op Granular Soil Sterilant
Co-op Total Vegetation Control
Co-op Weedrite Granules
Dalapon
Dowpon
Dowpon M
DyCleer 10P
Enide
Eptam 10G
Eramox 80W
Granular Soil Sterilants
Hoe-No-More
Hyvar X
Karmex
Kerb 50-W
Krovar I
Lexone DF
Mylone
NaTA TCA
No-Hoe
Primatol 80WP
Primatol 5:5G
Princep Nine-T
Princep 4G
Rival 10G
Sencor 75 DF
Simadex 80W
Simmaprim 80W
Sinbar
Spike 80WP
Spike 5G
Tenoran 50W
Tordon 10K
Treflan QR5
Velpar
Weedrite

TABLE 18 — HERBICIDE CONCENTRATION AND MANUFACTURERS

NOTE: *Product availability code follows this table.*

SYMBOLS:
EC — emulsifiable concentrate
F — flowable
G — granular
SN — solution
P — pellets
WDG — water dispersible granule
WP — wettable powder
WSP — water soluble powder
g/L — grams/litre

TRADE NAME	GENERIC NAME	ACTIVE INGREDIENT AND FORMULATION	MANUFACTURER
Aatrex (for agricultural use)	Atrazine	500 g/L F 90% WP	Ciba-Geigy
Aatrex-Nine-0	Atrazine	90% WDG	Ciba-Geigy
Aatrex-Plus	Atrazine + petroleum oil	400 g/L F	Ciba-Geigy
Afolan F	Linuron	450 g/L F	Hoechst
Alanap 3	Naptalam	240 g/L EC	Uniroyal Chemical
Agriculture Weedkiller No. 1	mineral oil 100% aromatics 13-24%	100% SN	Ciba-Geigy
Allizol	amitrole	95% WSP	Union Carbide
Amiben	Chloramben	240 g/L SN	Pfizer
Amitrol-T	Amitrole	200 g/L SN	Union Carbide
Amizine	Amitrole + Simazine 106 g/L + 53 g/L	159 g/L SN	Union Carbide

TRADE NAME	GENERIC NAME	ACTIVE INGREDIENT AND FORMULATION	MANUFACTURER
Asulox F	Asulam	400 g/L SN	May & Baker
Atra-Mix	Atrazine + petroleum oil	400 g/L F	Chipman Chemicals
Atra-pell	atrazine + 2,4-D(1:1)	10% G	Tam O'Shanter Industries Ltd.
Atrazine	Atrazine	80% WP	Chipman Chemicals
Atrazine 500	Atrazine	500 g/L F	May and Baker
Atrazine 500	Atrazine	500 g/L F	Pfizer
Atrazine Liquid	Atrazine	500 g/L F	Chipman Chemicals
Atrazine 80 W	Atrazine	80% WP	May and Baker
Avadex BW	Triallate	400 g/L EC 10% G	Monsanto
Avenge 200-C	Difenzoquat	200 g/L SN	Cyanamid of Canada Limited
Banvel	Dicamba	400 g/L SN	Velsicol Corporation of Canada
Banvel	Dicamba	480 g/L SN	Velsicol Corporation of Canada
Banvel 10 G	Dicamba	10% G	Velsicol Corporation of Canada
Bar-fox	TCA	83%	Green Cross
Basagran	Bentazon	480 g/L SN	BASF
Basamid Granular	Dazomet	98% G	BASF
Basfapon	Dalapon	74% WSP	BASF
Benazolin	Benazolin	330 g/L SN	BFC Chemicals Inc
Betanal	Phenmedipham	150 g/L EC	Nor-Am Agri. Products Inc.
Betanex	Desmedipham	150 g/L EC	Nor-Am Agri. Products Inc.
Betasan	Bensulide	480 g/L EC 12.5% G	Stauffer Chemical Co.
Bladex	Cyanazine	480 g/L F 80% WP	Ciba-Geigy
Bladex TTC	Cyanazine	480 g/L F	Ciba-Geigy
Blagal	Cyanazine + MCPA (1:2)	375 g/L F	Ciba-Geigy
Bromox 720 M	Bromoxynil Octanoate + MCPA ester (360 g/L each)	720 g/L EC	Union Carbide
Buctril M	Bromoxynil Octanoate + MCPA ester (280 g/L each)	560 g/L EC	May & Baker
Calmix Pellets	Bromacil 3% + 2,4-D acid 5%	8% P	Union Carbide
Carbyne 2 EC	Barban	240 g/L EC	Velsicol Corporation
Casoron 4G	Dichlobenil	4% G	Ciba-Geigy
Casoron G-4	Dichlobenil	4% G	Pfizer
Chloro-IPC	Chlorpropham	480 g/L EC	PPG Industries Stanchem
Cobutox	2,4-DB iso-octyl ester Butyric	400 g/L	Interprovincial Co-op
Compitox	MCPP	150 g/L SN	May & Baker Limited
Compitox Plus	MCPP + 2,4-D (50%, 50%)	200 g/L SN	May & Baker Limited
Co-op Atrazine 500 F	atrazine	500 g/L F	Interprovincial Co-op
Co-op Atrazine 90 WP	atrazine	90% WP	Interprovincial Co-op
Co-op Garden Weed Preventer	Trifluralin	1.47% G	Interprovincial Co-op
Co-op Granular Soil Sterilant	Sodium Metaborate Tetrahydrate 66.5% Sodium chlorate 30% Diuron 1.25%	97.75% G	Interprovincial Co-op
Co-op Lawn Weed Killer	2,4-D	200 g/L SN	Interprovincial Co-op
Co-op Premium Lawn Weed Killer	2,4-D + Mecoprop (125 g/L each)	250 g/L SN	Interprovincial Co-op
Co-op Premium Spot Weed Killer	2,4-D + Mecoprop amine (3 g/L each)	6 g/L SN	Interprovincial Co-op
Co-op Premium Turf Herbicide	2,4-D + Mecoprop (125 g/L each)	250 g/L SN	Interprovincial Co-op
Co-op Sodium TCA	sodium trichloroacetic acid	85% WSP	Interprovincial Co-op
Co-op Total Vegetation Control (Soil sterilant)	Sodium metaborate 68% Sodium chlorate 30% Boron equivalent 7.2%	105.2% G	Interprovincial Co-op
Co-op Weedrite granules	Paraquat 2.5% Diquat 2.5%	5% G	Interprovincial Co-op

TRADE NAME	GENERIC NAME	ACTIVE INGREDIENT AND FORMULATION	MANUFACTURER
Dalapon	Dalapon	74% WP 25% WSP	Union Carbide Chipman Chemicals May and Baker Interprovincial Co-op Pfizer
Desormone 7	Dichlorprop/2,4-D (1:1)	700 g/L EC	Union Carbide
Diphenoprop 700	2,4-D/Dichlorprop (1:1)	700 g/L EC	Pfizer
Dowfume MC 2	Methyl Bromide	98%	Dow Chemical Canada Inc.
Dowpon, Dowpon M	Dalapon	74% WP	Dow Chemical Canada Inc.
Dual	Metolachlor	960 g/L EC	Ciba-Geigy
Dy-Amine	2,4-D	500 g/L SN	Pfizer
Dyanap	Naptalan + Dinoseb 220 g/L + 110 g/L	330 g/L SN	Uniroyal
DyCleer (Industrial)	Dicamba	400 g/L SN	Velsicol Corporation
DyCleer 24 (Industrial)	Dicamba + 2,4-D (200 g/L + 400 g/L)	600 g/L SN	Velsicol Corporation
DyVel	Dicamba + MCPAK 84 g/L + 336 g/L	420 g/L SN	Velsicol Corporation
Embark 1.55 PGR	Melfluidide	150 g/L SN	3M Corporation
Embutox E	2,4-DB iso-octyl ester (Butyric)	400 g/L EC	May & Baker Ltd.
Enide	Diphenamid	50% WP	TUCO Products
Eptam 8-E	EPTC	800 g/L EC	Stauffer Chemical Co.
Eptam 10G	EPTC	10% G	Stauffer Chemical Co.
Eradicane 8-E	EPTC + Crop Protectant	800 g/L EC	Stauffer Chemical Co.
Eramox (Industrial)	Atrazine + Simazine (40% + 40%)	80% WP	Ciba-Geigy
Estaprop	Dichlorprop + 2,4-D 300 g/L + 300 g/L	600 g/L EC	May and Baker Ltd.
Estemine MCPA	MCPA non volatile amine	500 g/L SN	Ciba-Geigy
Estemine 2,4-D	2,4-D non volatile amine	500 g/L SN	Ciba-Geigy
Esteron 600 (Forestry)	2,4-D low volatile ester	600 g/L EC	Dow Chemical Canada Inc.
Esteron LV 600	2,4-D low volatile ester	600 g/L EC	Dow Chemical Canada Inc.
Esteron 99	2,4-D low volatile ester	500 g/L EC	Dow Chemical Canada Inc.
Formula 40 C	2,4-D amine	500 g/L SN	Dow Chemical Canada Inc.
Gramoxone	Paraquat	200 g/L SN	I.C.I. Plant Protection Ltd.
Gramoxone S	Paraquat	200 g/L SN	I.C.I. Plant Protection Ltd.
Herbicide 273	Endothal	360 g/L EC	Pennwalt Corporation
Hoe-Grass 284	Diclofop methyl	284 g/L EC	Hoechst
Hoe-Grass II	Diclofop Methyl bromoxynil (ester)	230 g/L + 80 g/L EC	Hoechst
Hoe-No-More	Chloramben	4% G	Ciba-Geigy
Hyvar X	Bromacil	80% WP	DuPont Co.
Hyvar XL	Bromacil	240 g/L SN	DuPont Co.
Karmex	Diuron	80% WP	DuPont Co.
Kerb 50 W	Propyzamide	50% WP	Rohm & Haas Canada Inc.
Killex (single strength)	Dicamba (9 g/L), 2,4-D (100 g/L), Mecoprop (50 g/L)	159 g/L SN	Ciba-Geigy
Killex (double strength)	Dicamba (18 g/L), 2,4-D (200 g/L), Mecoprop (100 g/L)	318 g/L SN	Ciba-Geigy
Kil-Mor	Dicamba (110 g/L), 2,4-D (310 g/L), Mecoprop (80 g/L)	500 g/L SN	Ciba-Geigy
Krenite	Ammonium ethyl carbamoylphosphonate	480 g/L EC	DuPont of Canada Ltd.
Krovar I	Bromacil + diuron (40% + 40%)	80% WP	DuPont

TRADE NAME	GENERIC NAME	ACTIVE INGREDIENT AND FORMULATION	MANUFACTURER
Laddok	Bentazon + Atrazine (200 g/L each)	400 g/L F	BASF
Lasso	Alachlor	480 g/L EC	Monsanto
Lexone DF	Metribuzin	75% dry flowable	DuPont
Lexone L	Metribuzin	480 g/L F	DuPont
Lontrel	Clopyralid	200 g/L EC	Dow Chemical of Canada Inc.
Lorox L	Linuron	480 g/L F	DuPont Co.
Mataven	Flamprop methyl	84 g/L EC	Ciba-Geigy
Mataven L	Flamprop methyl	52.5 g/L EC	Ciba-Geigy
MCPA	(2-methyl-4 chlorophenoxy) acetic acid as esters amines and sodium salts	250 g/L 300 g/L 500 g/L	See 2,4-D
MCPAK 400	Potassium salt of MCPA	400 g/L SN	Interprovincial Co-op
Mecoprop 300	MCPP	150 g/L SN	Pfizer
Mecoturf	MCPP (D-isomer)	150 g/L SN	May and Baker
Mecoturf plus 2,4-D	MCPP (D-isomer), + 2,4-D 200 g/L + 200 g/L	400 g/L SN	May and Baker
Mylone	Dazomet	50% G	Ciba-Geigy
NaTA TCA	Sodium Trichloroacetic acid	85% WSP	Hoechst
Nortron	Ethofumesate	180 g/L EC	Fisons
Pardner	Bromoxynil	280 g/L EC	May & Baker
Poast	Sethoxydim	184 g/L EC	BASF
Phenoxylene Plus	MCPA (sodium potassium salts)	250 g/L SN	Fisons
Potato Top Killer 300	Dinoseb	300 g/L 3 SN	Dow Chemical Canada Inc.
Prefar	Bensulide	480 g/L EC	Stauffer Chemical Co.
Primatol (Industrial)	Atrazine	80% WP 500 g/L F	Ciba-Geigy
Primatol Granular (Industrial)	Atrazine + 2,4-D (5% + 5%)	10% G	Ciba-Geigy
Primextra	Metolachlor (300 g/L), Atrazine (190 g/L), Related active triazines (10 g/L)	500 g/L F	Ciba-Geigy
Princep Nine-T (Agricultural)	Simazine	90% WDG	Ciba-Geigy
Princep 4 G (Agricultural)	Simazine	4% G	Ciba-Geigy
Propaturf	2,4-D + dichloroprop (350 g/L)	700 g/L EC	May and Baker
Randox	CDAA	480 g/L EC	Monsanto
Reglone	Diquat	200 g/L SN	ICI Plant Protection Ltd.
Reglone A	Diquat	200 g/L SN	ICI Plant Protection Ltd.
Rival	Trifluralin	500 g/L EC	Hoechst
Rival 10 G	Trifluralin	10% G	Hoechst
Ro-Neet 7.2E	Cycloate	720 g/L EC	Stauffer Chemical Co.
Roundup	Glyphosate	356 g/L SN	Monsanto
Sabre	Bromoxynil (Octanoate and Butyric) + MCPA ester (360 g/L each)	720 g/L EC	Union Carbide
Sencor 500	Metribuzin	500 g/L F	Chemagro
Sencor 75 DF	Metribuzin	75% dry flowable	Chemagro
Silvaprop LV700 1-1 Brushkiller	2,4-D + dichloroprop (50%) + (50%)	700 g/L EC	May and Baker
Simadex	Simazine	500 g/L F	Fisons
Simadex 80 W	Simazine	80% WP	Fisons
Simmaprim (Industrial, Aquatic)	Simazine	80% WP	Ciba-Geigy
Sinbar	Terbacil	80% WP	DuPont

TRADE NAME	GENERIC NAME	ACTIVE INGREDIENT AND FORMULATION	MANUFACTURER
Sinox PE	Dinoseb	360 g/L SN	May and Baker
Spike	Terbuthiuron	80% WP 5% G	Elanco
Stampede 360	Propanil	360 g/L SN	Rohm & Haas
Stampede CM	Propanil + MCPA 360 g/L + 100 g/L	460 g/L EC	Rohm & Haas
Super Compitox	Mecoprop + 2,4-D	200 g/L	May and Baker
Sutan +	Butylate	800 g/L EC	Stauffer Chemical Co.
Sweep	Paraquat	250 g/L SN	Chipman Inc.
Target	MCPA (275 g/L), Mecoprop (62.5 g/L), Dicamba (62.5 g/L)	400 g/L SN	Ciba-Geigy
TCA solution	Sodium Trichloroacetic acid	568 g/L SN	Pfizer
Tenoran	Chloroxuron	50% WP	Ciba-Geigy
Torch DS	Bromoxynil (Octanoic and Butyric)	450 g/L EC	Union Carbide
Tordon 22 K	Picloram	240 g/L SN	Dow Chemical Canada Inc.
Tordon 101	Picloram + 2,4-D (60 g/L) + (240 g/L)	300 g/L SN	Dow Chemical Canada Inc.
Tordon 10K	Picloram	10% P	Dow Chemical Canada Inc.
Tordon 202 C	Picloram + 2,4-D (1:16)	212 g/L SN	Dow Chemical Canada Inc.
Totril	Ioxynil	225 g/L EC	May & Baker
Treflan EC	Trifluralin	400 g/L EC 545 g/L EC	Elanco Products
Treflan QR 5	Trifluralin	5% G	Elanco Products
Triflurex	Trifluralin	400 g/L EC	Shamrock Chemicals
Tropotox Plus	MCPB and MCPA	400 g/L SN	May & Baker
2,4-D	2,4-dichlorophenoxy acetic acid, low volatile esters and amines	250 g/L 300 g/L 500 g/L 600 g/L 800 g/L	Union Carbide; Chipman Chemicals, Federated Co-op, Dow Chemical Canada Inc., Fisons, Green Cross, Niagara, Pfizer, Shell Oil, Stanchem, Oliver Chemicals, Uniroyal
2,4-D Butyric 400	2,4-DB, as mixed butyl esters	400 g/L EC	Pfizer
Vapam	Metam	380 g/L	Stauffer Chemical Co.
Velpar	Hexazinone	90% WSP	DuPont of Canada Ltd.
Vorlex	Methyl 150, Thiocyanate + C_3 Hydrocarbons (225 g/L) + (900 g/L)	1125 g/L	NorAm
Weed-No-More	2,4-D	150 g/L SN	Ciba-Geigy
Weedrite	paraquet + diquat	5% WDG	Wilson

Weed Control Glossary

Abscission layer — separation layer that develops typically (not always) at the base of the leaf stalk, which eventually permits the leaf to fall. In some species, this layer forms even before the leaf is mature.

Acid equivalent — theoretical yield of parent acid from an active ingredient. For example, the active ingredient in a 2,4,-D formulation may be 2,4-D amine or 2,4-D ester. The parent acid is the 2,4-D, and the acid equivalent is the amount of 2,4-D (acid) in the formulation. This amount is usually given as grams per litre.

Active ingredient — chemical compound in a product that is responsible for the herbicidal effects.

Adjuvant — ingredient which when added to a formulation or spray mixture alters the action of the active ingredient.

Amine — water-soluble, non-volatile herbicide that forms a true solution in water.

Annual — plant that completes its life cycle from seed in less than one year. Summer annuals begin growth in the spring and mature by fall. Winter annuals begin growth in the fall and mature the following spring or early summer.

Authorized applicator — applicator having a current license under the Pesticides and Fertilizers Control Act, and approved by the Weed Control Section of Manitoba Agriculture for applying the specified product.

Band treatment — herbicide applied as a narrow strip over the crop row, usually combined with inter-row cultivation.

Biennial — a plant which completes its life cycle in two years. Usually a rosette is produced in the first year and in the second year it flowers, sets seed and dies.

Compatible — compounds or formulations that can be mixed and applied together without undesirably altering their separate effects.

Contact herbicide — herbicide that does not move within the plant and has a direct effect only on that part of the plant which is covered by the spray mixture.

Crop protectant — additive to a herbicide that protects the crop against the effects of the herbicide.

Desiccation — the chemically accelerated drying of plants. The ripening of the crop is more uniform.

Directed spray — spray directed on weeds or soil in such a manner as to avoid contact with the crop.

Dormant — resting stage similar to the condition of a plant during the winter.

Drag-off — procedure of knocking down seeding hills, spraying and re-hilling prior to emergence.

Dry flowable — herbicide formulation composed of small granules of active and inert ingredients for dilution in water to form a suspension. Can be measured volumetrically or by weight.

Emergence — time at which the seedling first appears above the ground.

Emulsion — mixture of two liquids held together by a third chemical or emulsifier (usually oil in water with an emulsifier).

Estemine — specially formulated MCPA or 2,4-D amine.

Ester — oil-soluble herbicide that forms an emulsion when mixed with water.

Flowable (liquid) — herbicide formulation with solid particles suspended in a liquid, similar to a wettable powder in a slurry form.

Formulation — type of herbicide commercially available, such as ester, amine, or sodium salt.

Granular formulation — herbicide formulated by attaching it to a granular material such as clay.

Herbicide — chemical which is used to destroy or inhibit growth of weeds.

Incorporation — thorough mixing of a chemical into the soil to a depth recommended for the specific product.

Low volatile ester (LV) — oil-soluble herbicide similar to an ester but usually less volatile because it has a longer molecular chain.

Non-selective herbicide — herbicide that can be used to control plants generally without regard to species.

Patch treatment — application of a herbicide to infested areas within a field.

Perennial — plant that normally lives for more than two years.

Postemergence — application after the crop and weeds emerge.

Potassium salt — a water soluble, non-volatile herbicide that forms a true solution in water.

Precipitate — a substance, usually crystalline, separated from a solution as a solid. May be formed by the interaction of two pesticides or a pesticide and water. The precipitate settles and may clog screens and filters.

Preemergence — application before the crop and weeds emerge.

Preplant — application before a crop is planted.

Product — contents of a herbicide container as marketed.

Resistant — crop not damaged by a herbicide if applied as recommended, or a weed not controlled by any practical rate of a herbicide.

Seedling — refers to the early stages of growth of crop plants or weeds; technically a plant prior to the development of a root system other than the seed or seminal root.

Selective herbicide — chemical used in such a manner that it will control weeds in a growing crop without damaging the crop.

Sodium salt — water-soluble non-volatile herbicide that forms a true solution in water.

Soil sterilant — chemical that prevents the growth of all plants for an extended period of time.

Soluble powder — salt formulated as a powder and soluble in water.

Spot treatment — application of a herbicide to an infestation not exceeding 1 acre (0.4 ha) in size, and where the total of all spots treated does not exceed 5 per cent of the total field.

Stale seedbed — seedbed prepared for planting, with subsequent weed growth controlled with a herbicide, thereby allowing the crop to be seeded with minimal soil disturbance.

Surfactant — wetting agent.

Susceptible — crop that may be damaged, or a weed that may be controlled readily by a recommended rate of herbicide.

Tank mix — two chemicals that are purchased separately and mixed in the sprayer tank - as opposed to a mixture formulated by the manufacturer.

Tolerance — ability of a plant to withstand the herbicidal effects of a chemical so that the plant's growth and development are not adversely affected.

Translocated herbicide (systemic) — herbicide that moves within the plant.

Water dispersible granule — granular formulation designed to be dispersed in water for application as a spray.

Weed control — process of limiting weed infestations so that crops can be grown profitably or other operations can be conducted efficiently.

Wettable powder — powder that will readily form a suspension in water. Suspensions require agitation to prevent settling of the solid particles.

Manitoba Agriculture

TABLE 19 1986 Field Crops Chart — Recommended Herbicides

HERBICIDES	CROPS: CEREALS					CROPS: OIL SEEDS						CROPS: OTHER					
	Barley	Oats	Rye	Triticale	Wheat	Flax	Mustard	Rapeseed (Canola)	Triazine Tolerant Canola	Soybeans	Sunflowers	Bean Field	Canary Seed	Fababeans	Lentils	Peas	Tame Buckwheat
Afolan/Lorox + MCPA amine	X	X			X												
Amiben + Treflan										X[8]	X[2]						
Asulox F						X											
Avadex BW	X				X	X	X	X	X							X[3]	
Avenge 200C	X		X[10]	X[1]	X[6]								X				
Banvel + MCPA or 2, 4-D	X	X[5]			X								X[5]				
Basagran						X				X		X		X		X	
Basfapon/Dalapon/Dowpon/Dowpon M						X		X	X							X	X[6]
Benazolin								X									
Bladex L Bladex TTC									X								
Blagal	X	X			X	X											
Bromox 720 M, Buctril M, Sabre	X	X			X	X							X				
Carbyne 2EC	X				X												
Dyvel	X	X			X												
Eptam						X					X	X					
Estaprop	X				X												
Hoe-Grass 284	X[8]		X	X	X	X	X	X	X	X	X[10]	X		X	X	X	X
Hoe-Grass II	X[8]				X	X											
Kil-Mor	X	X			X												
Lexone/Sencor	X[11]				X				X[12]						X	X	
Lontrel								X	X								
Mataven/Mataven L				X	X[13]						X		X				
MCPA	X	X	X		X	X										X[14]	
Pardner/Torch DS	X	X	X	X	X	X[16]							X				
Poast						X		X	X	X							
Rival/Treflan/Trifurex	X[8]				X[16]	X[17]	X	X	X	X	X	X		X	X[18]	X	
Sencor 500 F + Treflan EC									X	X				X			
Sinox												X		X		X	
Stampede 360	X	X			X	X											
Stampede CM	X	X			X	X							X				
Target	X	X			X												
TCA	X	X				X		X	X							X[15]	
TCA + MCPA or 2, 4-D	X	X[5]				X[5]											
Tordon 202C	X[7]				X[7]												
Tropotox Plus																X	
2, 4-D	X		X		X												

HERBICIDES	WEEDS																										
	Barnyard Grass	Foxtail Green	Foxtail, Yellow	Persian Darnel	Wild Oats	Quack Grass	Bindweed Field	Bladder Campion	Blue Bur	Buckwheat Tartary	Buckwheat Wild	Burdock	Catchfly, Night-flowering	Chickweed	Cleavers	Cockle Cow	Cocklebur	[illegible]	Dandelion	Dragonhead American	Flixweed (Seedlings)	Galinsoga Hairy	[illegible]	Goosefoot Oak-leaved	Hemp-nettle	Knotweed Prostrate	Kochia
Afolan/Lorox + MCPA amine		S	S							●	●	●		●		●	●	●			●	●			●	●	●
Amiben + Treflan	●	●	●		S						S			●		●											●
Asulox F	S	S			●				S		S																
Avadex BW					●																						
Avenge 200C					●																						
Banvel + MCPA or 2, 4-D							☐		●	●	●	●			●	●	●	●			●				●		●
Basagran							☐							●			●	●				●					
Basfapon/Dalapon/Dowpon/Dowpon M		●	●																								
Benazolin																											
Bladex L Bladex TTC											●			●	●										●		
Blagal										●	●			●											●		
Bromox 720 M, Buctril M, Sabre									●	●	●					●				S	●						
Carbyne 2EC					●																						
Dyvel							☐			●	●				●	●	●				●				●	●	
Eptam	●	●	●		●	S								●													
Estaprop									●	●	●	●					●				●			●			●
Hoe-Grass 284	●	●	●	●	●																						
Hoe-Grass II	●	●	●	●	●					●	●					●											
Kil-Mor							☐			●	●					●	●				●					●	
Lexone/Sencor										●				●											●		
Lontrel											●																
Mataven/Mataven L					●																						
MCPA							☐		●			★					★		☐		★	●		●	●		
Pardner/Torch DS										●	●					●											●
Poast	●	●	●	●	●																						
Rival/Treflan/Trifurex	●	●	●	●	S						S			●		●										●	
Sencor 500 F + Treflan EC	●	●	●		S						S			●		●									●		
Sinox																											
Stampede 360		●	●							●	●																
Stampede CM		●	●						●	●	●										●						●
Target							☐			●	●					●		●			●				S	●	
TCA		●	●																								
TCA + MCPA or 2, 4-D		●	●									●									●						
Tordon 202C										●	●						●		☐								
Tropotox Plus							☐														●				●		
2, 4-D							☐		●			★					●		☐		★		●	●			

HERBICIDES	WEEDS																								
	[illegible]	Lettuce Prickly	Mustard Ball	Mustard Dog	Mustard Hare's ear	Mustard, Indian	Mustard Tumble	Mustard Wild	Mustard Wormseed	Pigweed Prostrate	Pigweed, Red Root	Pigweed Russian	Pigweed Tumble	Purslane	Radish Wild	Ragweed, Common	Ragweed False	Ragweed Giant	Russian-thistle	Scentless Chamomile	Shepherd's Purse (Seedlings)	Annual Smartweed Species, Lady's Thumb	Sow Thistle (annual)	Sow Thistle (perennial)	Spurge Thyme-leaved
Afolan/Lorox + MCPA amine	●	●	●		●	●	●	●	●		●	●		●	●	●	●	●			●	●	●		
Amiben + Treflan	●							●			●			●		●			●			●			
Asulox F								S														S			
Avadex BW																									
Avenge 200C																									
Banvel + MCPA or 2, 4-D	●		●	●	●	●	●	●	●	●	●	●			●	●	●	●	●		●	●	●		
Basagran	●							●			●			●		●		●	●		●	●			
Basfapon/Dalapon/Dowpon/Dowpon M																									
Benazolin								S																	
Bladex L Bladex TTC	●							●													●	●			
Blagal			●				●	●	●												●	●			
Bromox 720 M, Buctril M, Sabre	●		●				●	●	●		●					●			●	●	●	●			
Carbyne 2EC																									
Dyvel	●		●		●		●	●	●	●	●	●			●	●	●	●	●		●	●	●	☐	
Eptam										●	●		●	●											
Estaprop	●		●	●	●	●	●	●	●		●	●				●	●	●	●		●	●	●	☐	
Hoe-Grass 284																									
Hoe-Grass II								●											●	●		●			
Kil-Mor	●		●	●	●	●	●	●	●	●	●					●	●	●	●		●	●	●	☐	
Lexone/Sencor	●		●					●			●								●			●			
Lontrel																				●				☐	
Mataven/Mataven L																									
MCPA		★	★	●	★		★	★	★			★	●	●	★	★	★	★			★		●	☐	★
Pardner/Torch DS	●							●											●	●		●			
Poast																									
Rival/Treflan/Trifurex	●										●			●					●						
Sencor 500 F + Treflan EC	●							●	●		●			●					●		●	●			
Sinox								●																	
Stampede 360	●										●										●	●			
Stampede CM	●							●			●										●	●			
Target	●		●	●	●	●	●	●	●	●	●					●	●	●	●		●	●	●	☐	
TCA																									
TCA + MCPA or 2, 4-D	●		●		●	●	●	●	●			●			●	●		●			●				
Tordon 202C	●							●			●								●			●		☐	
Tropotox Plus	●		●					●	●		●				●	●	●	●			●		●	☐	
2, 4-D	★	●	★	●	★	★	★	★	★			★		●	★	★	★	★	●		★		●	☐	★

						VOLUNTEER CROPS						
Spurge, Thyme-leaved	[illegible]	Stork's bill	Sunflower, Prairie	Sweet Clover, White	Thistle, Canada	Buckwheat, tame	Cereal grains (wheat, barley, rye)	Cereal grains (tame oats)	Corn	Flax (suppression only)	[illegible]	Sunflowers
	●				□						○	
	●											
	●											
	●			●	□					S'	○	
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	●										●	
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	●				□						○	●
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LEGEND: CROPS

- X Recommended on crop. See Guide for rates.
- 1 Welsh and Carman varieties only.
- 2 Apply in spring only.
- 3 Field peas only.
- 4 Use on Benito, Canuck, Chester Columbus, Fielder, HY320, Katepwa, Glenlea, Leader, Macoun, Neepawa and Selkirk only.
- 5 Use MCPA only.
- 6 Use Basfapon only.
- 7 Not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.
- 8 Liquid formulations post-plant incorporated to control green and yellow foxtail only. Rival 10G and Treflan QR5 pre-plant on barley, fall application only.
- 9 Do not use on Klages, Betzes, Norbert or Glenn.
- 10 Do not use on Corona.
- 11 Do not use on Klondike.
- 12 Use Sencor only.
- 13 Use only on varieties recommended to be grown in Manitoba.
- 14 Use sodium salt only.
- 15 Use on field peas only.
- 16 Post-plant incorporated to control green and yellow foxtail only.
- 17 Use Treflan QR5 or Rival 10G only. Apply in fall only.
- 18 Use on Cougar, Puma, Frontier, Rymin and Kodiak only.
- 19 Use Torch DS only.
- 20 Use Treflan EC or Triflurex only.

LEGEND: WEEDS

- ● Controlled by maximum rates recommended for crops. Where two brand names are recommended, the weed may not appear on both labels.
- ★ Controlled by rates less than the maximum recommended for crops.
- S Suppression.
- ○ Not labelled for control but adequate control can be expected.
- □ Top growth control only.
- a Use MCPAK for hemp nettle control.
- b Use Banvel + 2, 4-D only.
- c Split applications required for adequate control.
- d Volunteer rapeseed only on product label (non-triazine tolerant).
- e Rosette stage only.
- f Use LV ester only.
- g Regrowth can be expected.
- h Spring seedlings only.

DO NOT ALLOW SPRAY TO DRIFT

FROM THE TARGET AREA.

REFER TO 1986 GUIDE TO CHEMICAL WEED CONTROL AND PRODUCT LABELS FOR COMPLETE DETAILS.

Calibrate Your Sprayer

ADDITIONAL WEEDS SUSCEPTIBLE TO 2, 4-D AND MCPA FOR TOP GROWTH CONTROL (0.68 L/acre of products containing 500 g/L)

Biennial wormwood, blue lettuce, broadleaved plantain, common peppergrass, creeping buttercup, gumweed, hedge bindweed, hoary cress, leafy spurge, pineappleweed

MCPA only: Field horsetail, Russian knapweed

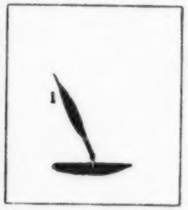
WEEDS WITH NO RECOMMENDED CHEMICAL CONTROL IN THE ABOVE CROPS

cockle, white (established)
cockle, purple
daisy, ox-eye
false-flax, small seeded
may weed, stinking
pepper grass, clasping-leaved
poverty weed

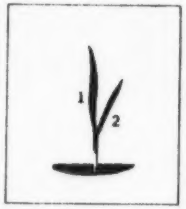
GOLDEN RULES FOR EFFECTIVE WEED CONTROL

Identify your weed problem
Select the proper herbicide for the crop and the weeds
Use amine formulations of 2, 4-D and MCPA for greater crop safety and to reduce the volatility hazard
Adjust and calibrate your sprayer
Apply herbicides at the proper stage for maximum weed control and crop safety
Take time to do a proper job of application
Leave check strip to compare results
Check fields frequently throughout the season to assess results
Look for ways to improve next year's weed control program

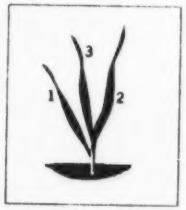
Leaf Stages of Cereals



One Leaf Stage

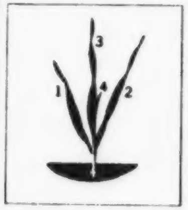


Two Leaf Stage

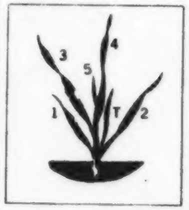


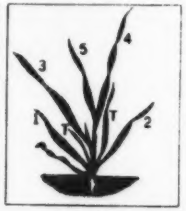
Three Leaf Stage

NOTE: The drawings are a guide in following recommendations for herbicide application to wheat, oats, barley and rye. Tillers (T) are not counted as leaves.



Four Leaf Stage ——→





Five Leaf Stage

Manitoba Agriculture

TABLE 20

1986 Forage Crops Chart — Recommended Herbicides

CROPS AND WEEDS	CROPS																							WEEDS																		
	GRASSES										SEEDLING LEGUMES					ESTABLISHED LEGUMES					COVER CROPS																					
HERBICIDES	Bromegrass	Creeping Red Fescue	Crested Wheatgrass	Intermediate Wheatgrass	Meadow Fescue	Orchardgrass	Reed Canarygrass	Russian Wild Ryegrass	Tall Wheatgrass	Timothy	Alfalfa	Alsike Clover	Sweet Clover	Trefoil	White Dutch Clover	Alfalfa	Red Clover	Sweet Clover	Trefoil	White Dutch Clover	Flax	Oats	Wheat	Barnyard Grass	Foxtail Barley	Foxtail, Green	Foxtail, Yellow	Wild Oats	Bindweed, Field	Blue Bur	Buckwheat, Wild	Burdock	Chickweed	Cleavers	Cockle, Cow	Cocklebur	Dandelion	Dock, Curled	Dragonhead, American	Flixweed (Seedlings)	Goosefoot, Oak-leaved	Gumweed
ASULOX F											X[1]					X[1]					X			S		S		●		S	S											
ASULOX F + EMBUTOX E											X[1]					X[1]								S		S		●		●	●											
AVADEX BW											X[2]	X[2]	X[2]	X[2]	X[2]						X		X					●														
AVENGE 200C	X[2]	X[2]	X[2]			X[2]	X[2]	X[2]		X[2]	X[2]		X[2]	X[2]									X[13]					●														
BANVEL		X[3]						X														X	X								●				●							
BANVEL + 2, 4-D		X[3]																					X						□	●	●	●		●	●	●	●	■	○	●	●	
BUCTRIL M	X[5]	X[5]	X[5]	X[5]	X[5]	X[5]	X[5]	X[5]	X[5]	X[5]											X	X	X							●	●				●	●			S	●		
CARBYNE 2EC	X															X	X	X										●														
COBUTOX, EMBUTOX E, 2, 4-D BUTYRIC 400											X	X		X	X							X	X						■		■							■			■	
DALAPON, DOWFON, DOWPON M, BASFAPON											X			X							X					●	●															
EPTAM											X			X										●	○	●	●	●					●									
HOE GRASS 284	X[5]	X[5]	X[5]	X[5]				X[5]			X[5]		X[5]								X		X	●		●	●	●														
KERB																X			X						●																	
MATAVEN	X[4]	X[4]		X[4]	X[4]			X[4]			X[4]			X[4]									X[13]					●														
MATAVEN L	X[4]	X[4]		X[4]	X[4]			X[4]			X[4]												X[13]					●														
MCPA OR 2, 4-D	X[6]	X[6]	X[6]	X[6]	X[6]	X[6]	X[6]	X[6]	X[6]	X[6]	X[7]	X[7]			X[7]	X[8]					X[9]	X[9]	X						□	●		●				●	□	■	○	●	●	□
PARDNER TORCH DS	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]											X[12]	X	X								●				●	●						
PARDNER + 2, 4-D OR MCPA	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]												X[9]	X						□	●	●	●			●	●	□	■	S	●	●	
PRINCEP NINE-T, SIMADEX 80W, SIMADEX FLOWABLE																X[10]			X					●		○	●	●		○	●		○							○	○	
ROUNDUP	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]	X[11]						X[11]	X[11]	X[11]			●		●	□		●											
SINBAR																X								●	●	●	●	○		○	○		●				○			○	○	
TROPOTOX PLUS												X			X							X	X						□									S	○			

Hawk's Beard, Narrow-leaved	Hemp-nettle	Kochia	Lamb's-quarters	Lettuce, Prickly	Mustard, Ball	Mustard, Hare's-ear	Mustard, Indian	Mustard, Tumble	Mustard, Wild	Pigweed, Prostrate	Pigweed, Red Root	Pigweed, Russian	Pigweed, Tumble	Purslane	Radish, Wild	Ragweed, Common	Ragweed, False	Russian-thistle	Scentless Chamomile (Seedlings)	Shepherd's Purse (Seedlings)	Smartweed, Lady's Thumb	Sow Thistle (Perennial)	Stinkweed (Seedlings)	Sunflower, Prairie	Sweet Clover, White	Wormwood, Biennial
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									●												●		●			
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	●a		●	●	●	●	●	●	●			●	●	●	●	●	●	●d		●	●	☐	●	○	●	
		●	●		●		○	●	●	○	●					●		●	●	●	●	☐a	●	○		
■			●		●				●		●					●	●			●		S	●			
			●							●	●		●	●												
	●a		●	●	●	●	●	●	●			●	●	●	●	●	●	●d		●		☐	●	○	●	☐
		●	●						●							●		●	●		●		●			
	●a	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●	●	☐a	●	○	●	
	○	○	●		○	○	○	○	○	○	○	○	○	●	○	●	●			○	●		○		●	
		●	●	●							●					●		●		●	●					
	○	○	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	○		○	○		●		○	
	S		●		●				●		■				S	■				■		☐	●			

WEEDS WITH NO RECOMMENDED CHEMICAL CONTROLS IN THESE CROPS

bladder campion	ox-eye daisy
biennial campion	white cockle

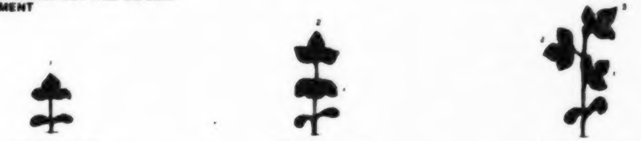
NOTES: CROPS

X — Product is recommended for the crop
1 Do not graze or harvest for livestock feed in the year of treatment
2 Use only on seeding grasses or legumes which are underseeded
3 For seed production only
4 For seed production only; only in the seeding year. Do not graze or harvest for livestock feed in the year of treatment
5 Use only in the year of establishment. Do not graze or harvest for livestock in the year of treatment
6 Use only 2,4-D amine. Not all brands are registered for this use
7 Use only when underseeded to flax. Do not use 2,4-D on flax
8 For use as a spot treatment only to control red bartsia
9 Do not use 2,4-D on flax or oats
10 Do not apply in the seeding year. Use Princep Nine T only
11 Seedling year only. Apply preplant or preemergence to crop but postemergence to weeds
12 Torch or Torch DS only
13 Check recommendations for varietal restrictions

LEGEND: WEEDS

- ● Controlled by rates recommended for crops. Where more than one brand name is recommended, the weed may not appear on all labels
- ○ Not labelled for control but adequate control can be expected
- ■ Controlled by higher recommended rates only
- ☐ Top growth control only
- **S** Suppression
- **a** Regrowth can be expected
- **d** Controlled by 2,4-D only
- **h** Will not control established plants
- **k** Controlled by MCPA K only
- **m** Controlled by MCPA only
- **w** Seedlings only

STAGES OF BIRDSFOOT TREFOIL LEAF DEVELOPMENT



1 TRIFOLIOLATE 2 TRIFOLIOLATE 3 TRIFOLIOLATE

STAGES OF ALFALFA, RED CLOVER AND ALSIKE CLOVER LEAF DEVELOPMENT

UNIFOLIOLATE 1 TRIFOLIOLATE 2 TRIFOLIOLATE 3 TRIFOLIOLATE